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# FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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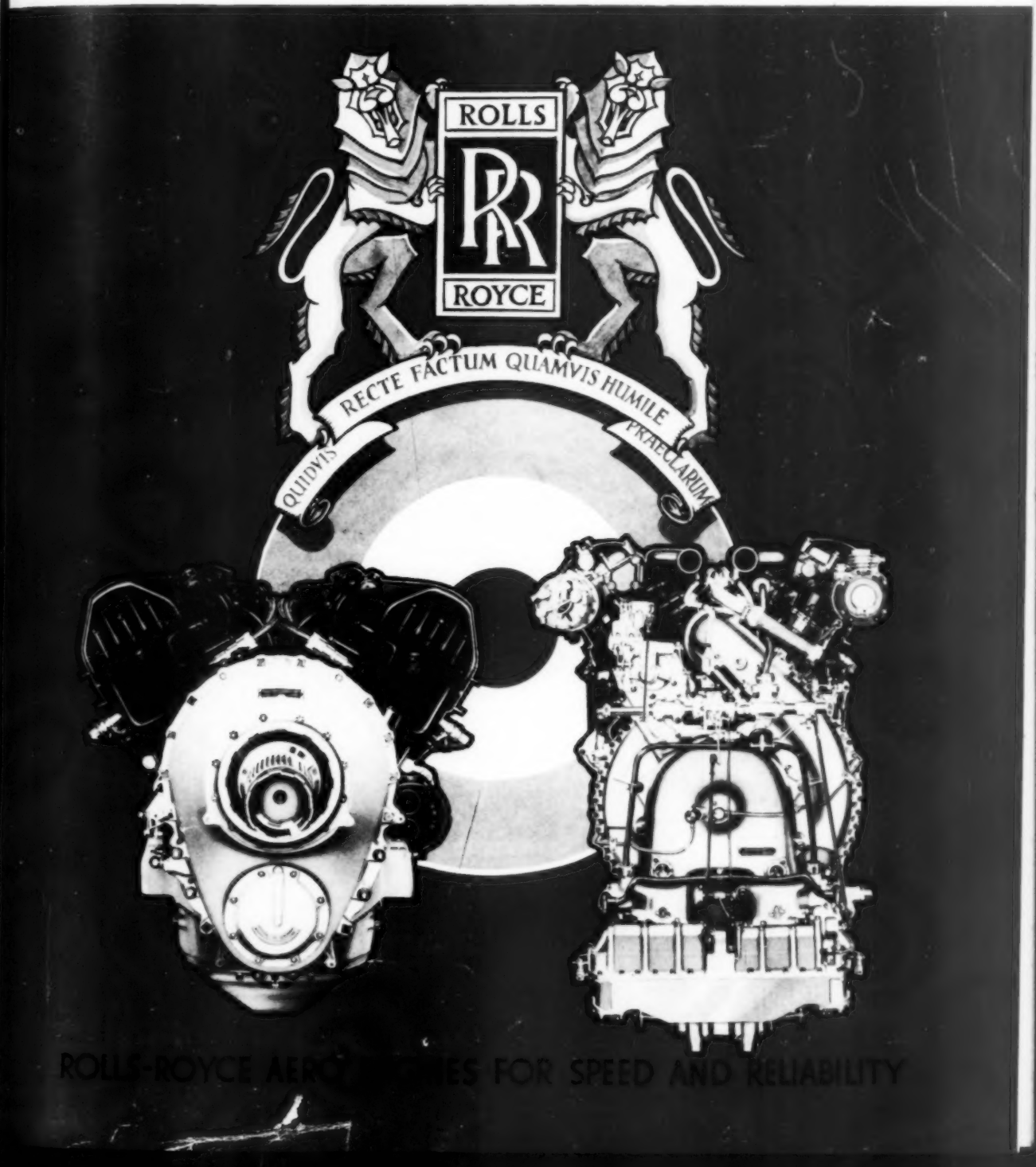

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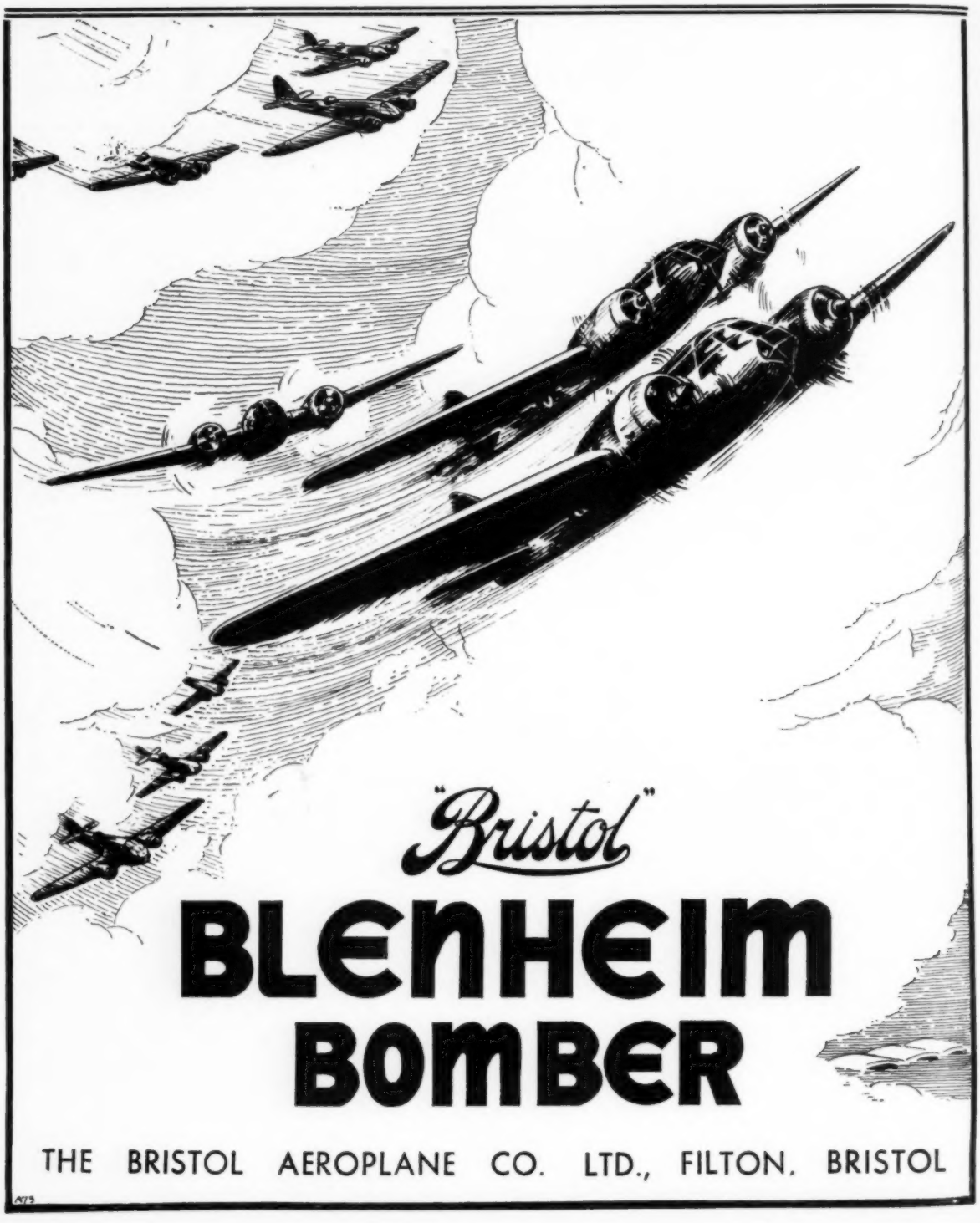

# FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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# The Outlook

## Cabotage

WITHOUT any fuss or bother, and without the world at large being aware of the fact, history has once more been made on the Medway. One day last week a few onlookers on the towpath at Rochester saw what seemed to be an ordinary Empire flying boat take off, circle and alight again. They may have noticed that she seemed a little deeper in the water than usual, but probably they did not. If they saw the name *Cabot* on the bows, the fact presumably conveyed little to them.

And yet they were witnessing a test which, a few years ago, would have been considered almost impossible. The new boat, which has Bristol Perseus sleeve-valve engines instead of the Pegasus of the Empire boats, was loaded to a gross weight of 1,000 lb. more than that of *Caledonia* at the start of the experimental trans-atlantic flight. That in itself was not, of course, very remarkable; it meant an increase in wing loading from 30 to 31 lb./sq. ft. What made the take-off notable was the fact that it was low tide in the Medway at the time and the wind was blowing across what little water was left in the river.

It is said that Mr. Lankester Parker, Short's chief test pilot, knows the river so well that he calls the cockles by their Christian names, but, even so, it was no mean feat to take *Cabot* off at a weight of 46,000 lb. How good the boat is was shown by the fact that the take-off occupied less than 20 seconds. The alighting was just as smooth.

The willing horse gets all the work, and the Air Ministry seems determined to test *Cabot* to the utmost. During further trials the boat will be fuelled in the air to a gross weight of 53,000 lb., and there is no reason to believe that this will present serious difficulty. But to expect the pilot, as apparently he is expected, to do stalls and stalled turns with a machine which must be very nearly "tangent" seems both unfair and unnecessary.

## Help for France

IT seems that both in France and in Italy there has been some misunderstanding of Sir Kingsley Wood's recent announcement that priority would be given to the production of fighters in this country. Both those countries seem to have concluded that this means that Britain is about to neglect its air striking force, and some French observers have commented that in another war naval blockade may take too long to produce an effect, while the British Army is small; with the result that the most effective aid which Britain could give to an ally would be a strong force of bombers.

These comments must be based on a misunderstanding of the term "priority," which was only meant to apply to production, and not to ultimate strength or strategy. We want fighters first, so as to make our cities as safe as possible, and we want a larger proportion of fighter squadrons than was once thought necessary. But we mean, none the less, to have that powerful force of bombers which can be expected to make any foreign Power think twice before engaging in hostilities with us or with our undoubted ally, France. No doubt the Prime Minister was able to give M. Daladier ample assurances on that point when they met recently in Paris, and one may be sure that the subject was discussed when Sir Kingsley Wood visited M. la Chambre last week.

## The Winged Messenger

BY flying from Southampton Water to Egypt non-stop with a ton of mails during a night, *Mercury*, upper component of the Short-Mayo composite, did something more than merely lending a hand with the huge Christmas mails. It made the first non-stop mail flight between the two countries, and it proved that with modern, reliable engines and proper radio equipment it is possible to carry on over the Empire routes during

## THE OUTLOOK (CONTINUED)

the dark hours. The time will assuredly come when the mailplane will fly night and day, thus saving a great deal of time. So long as aircraft carry passengers as well as mails, it will be necessary to give them at least an occasional night's rest on the ground. But mails ought not to be held up by nightfall.

During most of the year there are more hours of daylight than of darkness, and so it cannot be said, as has sometimes been done, that regular night flying will virtually double the speed of commercial aircraft on the Empire routes. But a very great speeding-up is possible, and when the necessary ground equipment is installed along the Empire routes we shall doubtless see the out-and-out mailplanes covering the distance between England, Australia and South Africa at average speeds of 250 m.p.h. or more. In the meantime *Mercury* has made history, and before long there will be attempts to beat the "record" of 14½ hours from Southampton Water to Egypt.

Had there been other upper components available *Maia* could have launched them and so have got that many more tons of mail away. That, of course, was the type of operation envisaged by Major Mayo when he evolved the composite aircraft idea. And in that case the cost would have been very reasonable. The present outfit is, however, experimental, and to derive the full benefit from the scheme landplane upper components with a very much higher cruising speed than that of the *Mercury* seaplane would be used. With proper hoisting and fuelling facilities one lower component should be able to launch an upper every hour or so. That may be the solution when we ultimately decide to be logical and carry all our mails in special machines without passenger accommodation.

### *German Aircraft Carriers*

IT is hardly to be imagined that the Admiralty will be seriously alarmed by the statement in Marshal Goering's paper that Germany intends to build two aircraft carriers at an early date, with two more to follow later on. One of the ships, we understand, is already nearing completion. The building of these ships would be in accordance with the Anglo-German Naval Agreement, which permits Germany to have a fleet of two-thirds the strength of the British Navy. The paper states that the German fleet proposes to take the offensive in the Atlantic, admitting that carriers are of no use in land-locked seas such as the Baltic and North Sea.

Such a strategic plan must be based on the theory that in the war which is envisaged Britain would not be the enemy of Germany. Otherwise it is not easy to see how the German Fleet would get out into the open Atlantic. Aircraft can fly over the outlets of the North Sea, but carriers cannot do so, nor can any other warships. It follows that no foreign fleet could reach the Atlantic from the North Sea except with the permission of the Royal Navy or after defeating the latter in a pitched battle and crippling its strength. An escape into the Atlantic by evasion is, perhaps, a possibility, though not a likely one; but a fleet which got away in that manner would be cut off from its bases, and would be in a hopeless position unless it could find new bases in an allied country. An aircraft carrier at large in the Atlantic with perhaps only a small escort would be especially liable to destruction or capture by a stronger naval Power.

DIARY OF FORTHCOMING EVENTS—PAGE 530

### *Wheels Within Wheels*

*FLIGHT* has on many occasions called attention to the multiplicity of materials specifications and to the need for reducing the number if production is to be speeded up. Non-standardisation of numerous accessories is another cause for irritation and delays And now a reader puts forward the somewhat surprising fact that aircraft designers themselves are to blame for nearly as great a diversity of wheel and tyre sizes.

According to his list, there are no fewer than 21 combinations of main wheels and tyres for Service aircraft standardised in English units, plus another 7 in metric sizes. Tail wheels are nearly as bad, the corresponding figures being 13 and 6.

It is difficult to believe that all these combinations of tyre sections and wheel diameters are necessary, and the sooner we get down to a few standard sizes the better. The penalty of having to carry wheels and tyres slightly heavier than they need be for any particular aeroplane, which is what a limitation in numbers would amount to, should not be really serious

### *Unnecessary Distress*

THE arrangements made for the transmission of arrival and departure messages about pilots making over-water crossings are quite optional and are designed only for the benefit of those people who wish to be saved from an unpleasant form of death.

We may choose to follow them or not, at our own will. They are not difficult, and the pilot who circles Lympne has a choice of six points on the other side once he has crossed over; if he returns for any reason Lympne is circled again to "cancel" his crossing.

Those pilots of multi-engined machines who prefer to make a direct Channel crossing between capital and capital are automatically looked after in that a departure message is passed on to Croydon, where it is passed on again to Le Bourget or to the particular Customs aerodrome at which the first overseas landing is being made.

Obviously, in the latter case, an unscheduled arrival at another aerodrome leaves the control officers in the air, and search arrangements are forthwith put into action—at considerable expense and discomfort to the searchers. As the Air Ministry explains, it is of the "utmost importance that pilots should adhere consistently to the procedure," if, that is, the system is being used at all, and it is added, by way of a warning, that "owners may be liable for the cost of the search."

There is absolutely no excuse for a pilot who casually drops in somewhere else and fails to see that the fact of his safe arrival is duly reported in the right quarter. At irregular intervals thoughtless people, safely in bed or at dinner somewhere in France or England, are reported missing, but only when these people are of "news value" is the fact of their failure to arrive given any considerable prominence.

Such a report was published last week-end, the pilot concerned being sufficiently well known for his "loss" to cause excitement. Probably the man in this case was not to blame, and the authorities at Buc aerodrome, where he actually landed, may have been neglectful. But such cases certainly make one wonder whether serious penalties ought not to be imposed for failure to comply with what are not mere red-tape regulations but sensible safety measures.

# The WELLESLEY'S STRUCTURE

*Practical Application of the Geodetic System Revealed in Detail : A Unique Military Aeroplane Described*

THE dictionary defines a geodetic curve as "the curve on which lies the shortest path, as given by a stretched frictionless cord, between two points on a curved body." The same meaning is differently expressed, in connection with navigation for instance, when we talk of a "Great Circle" track of a vessel or an aircraft. The great circle is the curve which results from slicing (let us say) an orange or apple into two equal parts, so that the cut passes through the centre of the sphere.

The recent achievement of the long-range Wellesleys in breaking the world's long-distance record suggests a happy association of great circle courses and geodetics.

The originators, Vickers-Armstrong, Ltd., Aviation Works, Weybridge, use the expression geodetic to denote a type of construction in which the bracing members are not placed vertically and horizontally in the sides and top and bottom panels of a fuselage, but run diagonally around the fuselage, forming two or more spirals of opposite direction.

To appreciate the reason for adopting this type of construction it is necessary to recall that torsional stresses in a fuselage, for instance, can only result in the fuselage twisting if the individual panels in the sides, top and bottom are deformed so that instead of being rectangles they become rhomboidal in shape. In stressed-skin construction the same thing happens, but the visible effect is a series of wrinkles which run at an angle of approximately 45 degrees with reference to each panel.

What, in effect, has been done is to cross over two curved diagonal members in each bay, attaching their two centres to one another. It will be realised that before a panel can distort, one of the geodesics (as the members are called) will tend to stretch while the other tends to compress. As the members are curved, and as their centres are locked together, it follows that the one which is in compression will tend to "bow" more, while the one in tension will try to "straighten out," but neither can do what it likes because it is being prevented by the other. In other words, the designer very cleverly sets one member against the other and the resulting loads very nearly cancel out.

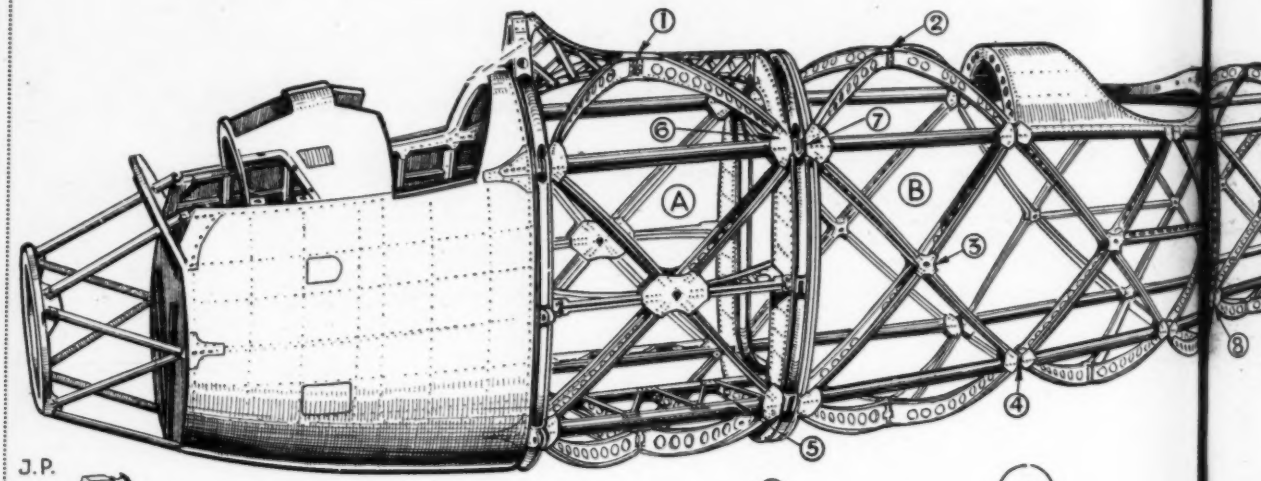
That, very briefly, is the fundamental principle of geodetic construction. In actual fact the problem is not nearly so simple, and instead of single simple panels with their geodesics there are longer and shorter panels with the geodesics crossing from one panel into another; sometimes there are no panels at all, as in the wing construction, in the sense of the old-fashioned fuselage panels or bays, and the structure resolves itself into a number of opposite spirals with spars to prevent them from closing up like the doors of London tube station lifts, and for taking bending loads. As the knowledge of geodetic construction increases it may even be possible to do away with the straight members and rely on geodesics only. However, that stage has not been reached yet, but the Wellesley should be regarded rather as a first attempt on a large scale and not as the final solution.

By opposing the two sets of geodesics in this way the strength/weight ratio of the structure is increased. It may be argued that in modern military machines, with the engine, fuel supply, military load and crew "given," there is not much scope left for the designer to save weight, as so many heavy items are outside his control.

**The high aspect ratio made possible by the geodetic construction of the Wellesley's wing is apparent in this take-off view. The arrangement of the retractable undercarriage may also be seen.**

# THE "FOUR-UNIT" FUSELAGE of the WELLESLEY

**The general arrangement of the fuselage is shown in the larger drawing, which also serves as a key to the locations of the units and joints illustrated in the smaller sketches. In the main, the sketches are self-explanatory. The two main bulkheads in the fuselage are built up of duralumin tubes and flat sheet, as shown in (7). The standard type of longeron joint is illustrated in (4), but where the diameter is stepped-down the union plug is also stepped, as shown in (8).**

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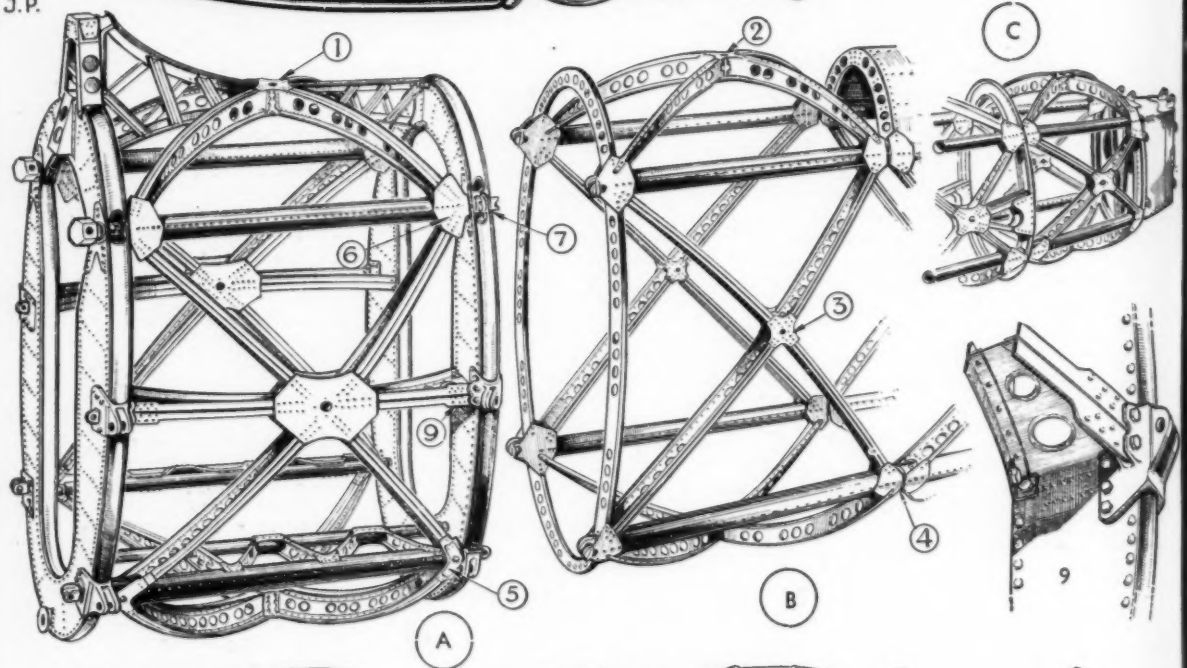


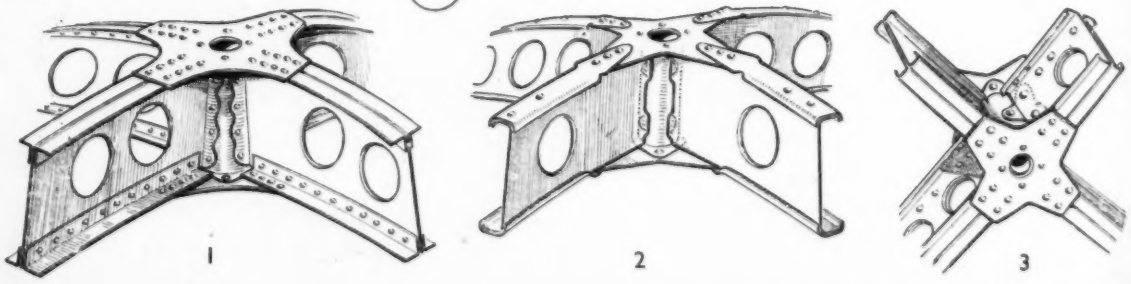

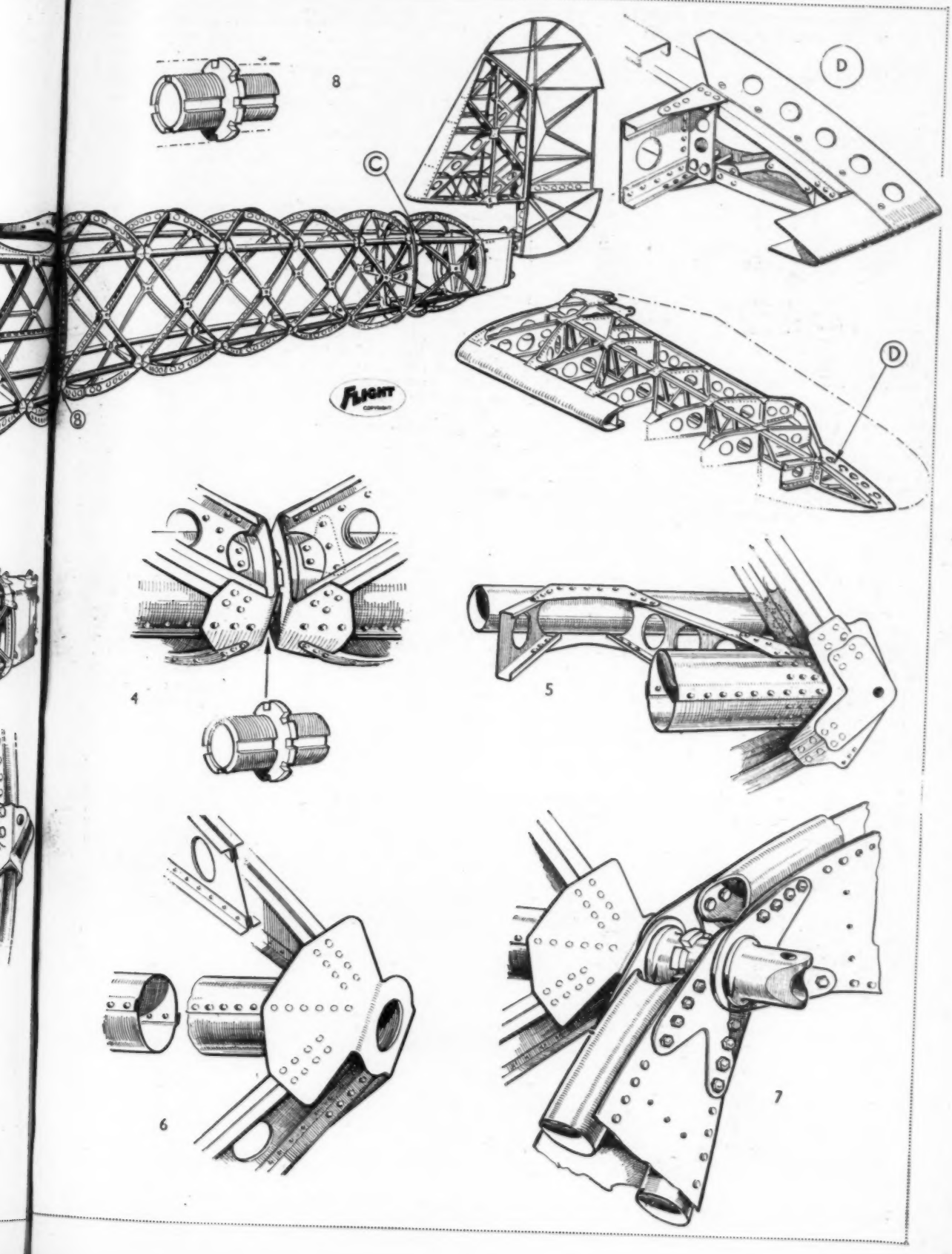
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## VICKERS WELLESLEY BOMBER
### Bristol Pegasus Engine

DIMENSIONS.

| | |
|---|---|
| Length o.a. | 39 ft. 3 in. (*11 m 96·3*) |
| Wing span | 74 ft. 7 in. (*22 m 731*) |
| Total wing span | 630 sq. ft. (*58,5²m*) |

WEIGHTS.

| | lb. | *kg* |
|---|---|---|
| Machine bare | 6,369 | *2 889* |
| Fixed equipment and instruments | 465 | *211* |
| Crew (2) and parachutes | 400 | *181* |
| Disposable load | 3,866 | *1 754* |
| Normal gross weight | 11,100 | *5 035* |
| Overload gross weight | 12,500 | *5 670* |
| Overload disposable load | 5,266 | *2 409* |

PERFORMANCE.

| Height. ft. | *metres* | Max. Speed * m.p.h. | *k/h* | Time of Climb. minutes |
|---|---|---|---|---|
| 0 | *0* | 178 | *287* | — |
| 3,280 | *1 000* | 188 | *303* | 2.70 |
| 6,560 | *2 000* | 198 | *319* | 5.75 |
| 9,840 | *3 000* | 199 | *321* | 8.60 |
| 13,120 | *4 000* | 209 | *336* | 11.40 |
| 16,400 | *5 000* | 220 | *354* | 14.30 |
| 19,680 | *6 000* | 228 | *367* | 17.50 |
| 22,960 | *7 000* | 226 | *364* | 21.50 |

| | |
|---|---|
| Initial rate of climb | 1,200 ft./min. (*6,08 m/sec*) |
| Absolute ceiling | 35,250 ft. (*10,750 m*) |
| Landing speed | 57 m.p.h. (*92 km/h*) |
| Take-off run | 263 yards (*240 metres*) |

*(From the fact that the maximum speed is attained at 20,000 ft. it appears unlikely that these figures refer to the Pegasus XX version.—*Ed.*)

Within reason that is so, but that there is still something to be said for weight-saving was shown by the long-range Wellesleys, which carried as disposable load something like 1½ times their own weight. What that represents may be more readily realised if we point out that the average disposable load for a large number of aeroplanes of different sizes is 67 per cent. of the tare weight. In other words, the Wellesley long-range machines carried twice the average disposable load. And that was without overloading, while still within their C. of A. weight. Add to this the high aspect ratio of the Wellesley's wings, which increases cruising range and decreases take-off run, and it is clear that there is much to be said for geodetic construction.

The subject of this description is the standard Wellesley as supplied to the R.A.F. However, the primary structure of the long-range type is identical and the only differences are in equipment and tankage, the long-range machines having their wings full of extra tanks and carrying, of course, none of the usual military equipment.

The Vickers Wellesley Type 287, with Bristol Pegasus XX engine is a development of the Wellesley 246. Designed as a bomber, it can also be adapted for general purpose duties. The main dimensions, weights and performance figures are given in the table. For the present we are concerned mainly with the geodetic construction.

The fuselage is built in four main units, as shown in the drawing on pp. 518-519, on which pages will also be found sketches of the main structural details. The forward fuselage portion is a metal monocoque structure, with three built-up I-section longerons on each side, intermediate frames of Z-section, and stringers of channel section, the whole covered with Alclad.

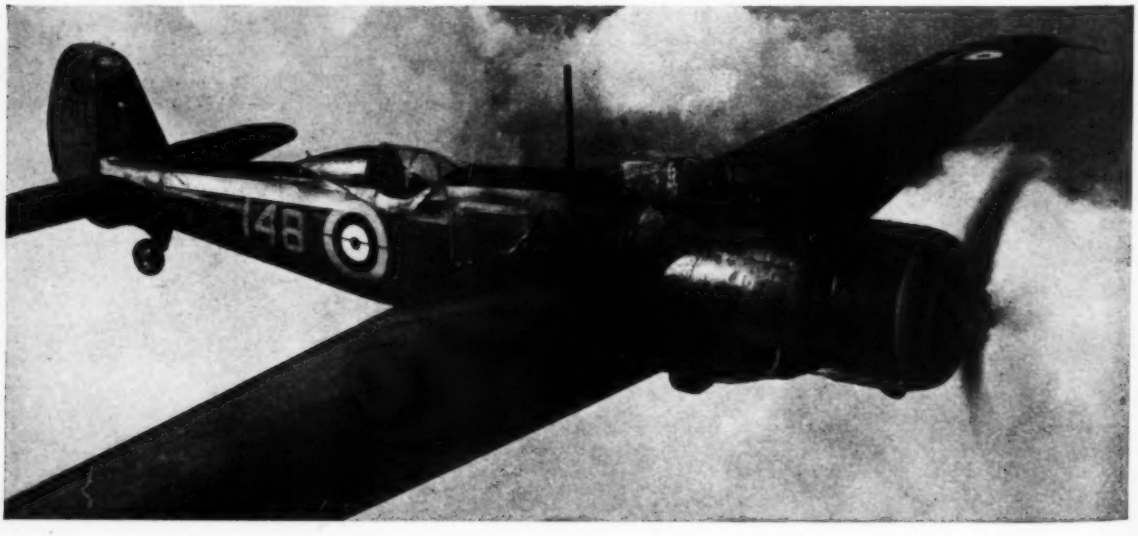
Next comes the wing spar bay of the fuselage. During a chat with the designer in the early days of geodetic construction, he remarked, for the benefit of those who advocated the mid-wing monoplane arrangement, that the fuselage frames which carry the wing spar attachments weigh as much as the rest of the fuselage. That was no exaggeration calculated to drive home an argument but a plain statement of fact. These spar frames do have to be very substantial in order to be able to resist the very considerable loads imposed by the wings.

Each of these hoop frames is in three pieces. The top piece is bolted to the two side pieces and to the top longerons. The side pieces, at the bottom of the fuselage, are connected by a single large tubular steel bolt. The hoop frames are formed of turned duralumin tubes at the outer and inner edges, the tube framework being covered with flat sheet panels of heavy gauge. The general construction can be seen in sketch A on p. 518.

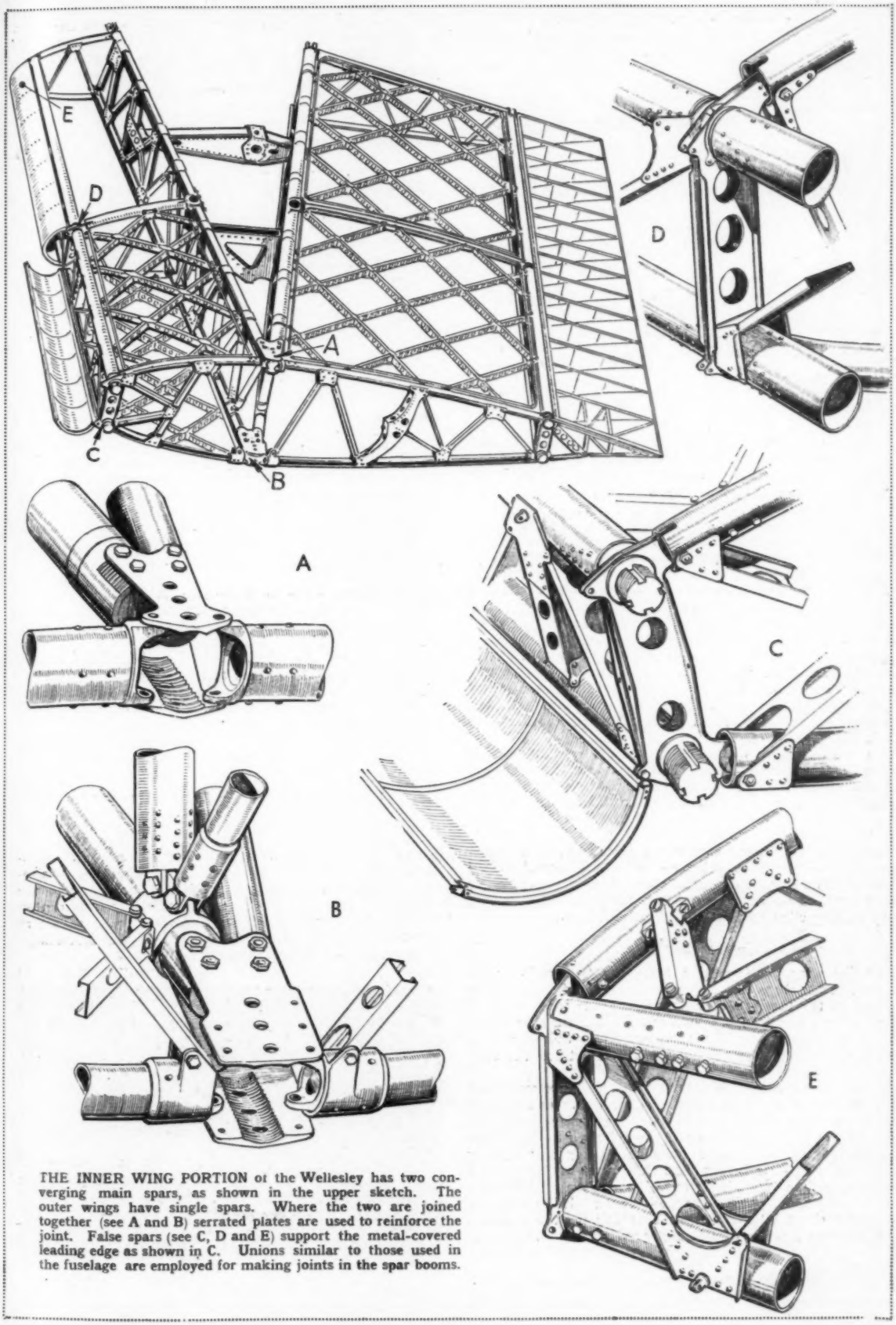
Longerons in the Wellesley fuselage are built-up tubes manufactured from strip, the two halves being "staggered" as shown in sketch 6 on page 519. Older readers of *Flight* may see in this type of longeron the modern equivalent of the built-up wooden longerons of the earlier Vickers types, such as the Virginia and Victoria.

As the fuselage is built in sections for ease of transport, storage and so forth, it has been necessary to provide a type of joint in the longerons which readily is "made" and "broken." It should be explained here that each fuselage section is of necessity a self-stabilised unit, the longerons being the members which prevent the geodetic bars from closing up on one another like the links in a pair of "lazy tongs." Riveted into the ends of the longerons of each fuselage section are plugs or liners tapped to receive left- and right-hand ferrules. Slots or keyways are cut in the sides of these ferrules, and engaging in the slots are lugs on the sheet-metal washer used for locking and unlocking the joint. A special spanner fits this washer. Typical ferrules and washers are shown in sketches 4 and 8 on page 519.

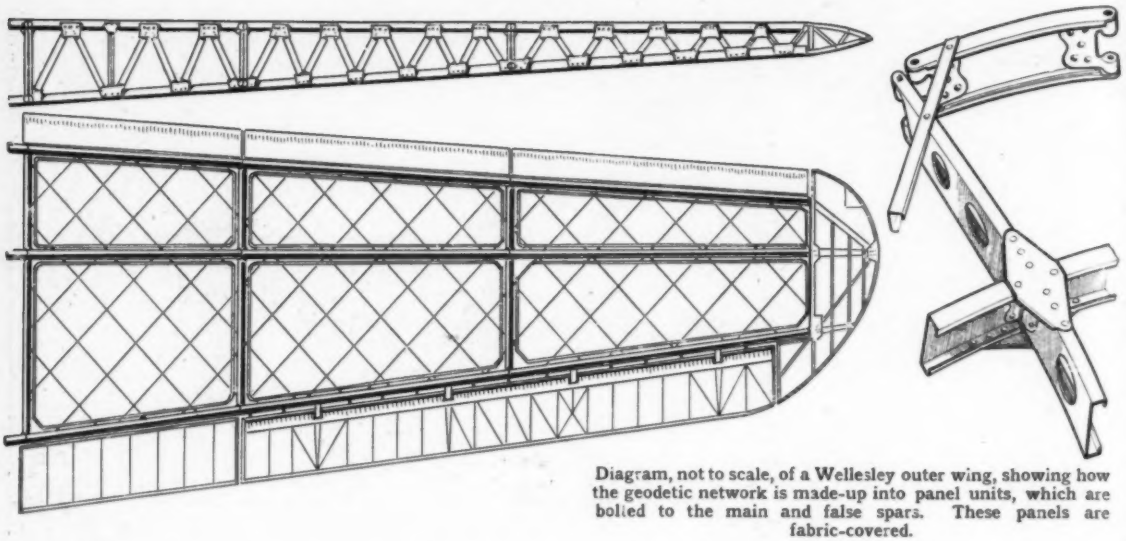
In order to provide an economical structure, the diameter of the longerons is "stepped down" from the front to



**The engine cowling arrangement on the long-range model differs from that of the standard type shown in the heading. This particular machine is a standard Wellesley used by the Bristol Company for engine tests.**




THE INNER WING PORTION of the Wellesley has two converging main spars, as shown in the upper sketch. The outer wings have single spars. Where the two are joined together (see A and B) serrated plates are used to reinforce the joint. False spars (see C, D and E) support the metal-covered leading edge as shown in C. Unions similar to those used in the fuselage are employed for making joints in the spar booms.



Diagram, not to scale, of a Wellesley outer wing, showing how the geodetic network is made-up into panel units, which are bolted to the main and false spars. These panels are fabric-covered.

the rear fuselage portions. At the points where the change in diameter is made, the two ends of the ferrule are of different diameters, as shown in sketch 8, the plugs in the longerons ends being, of course, drilled and tapped correspondingly.

The geodetic bars, which as already explained form two spirals running around the fuselage in opposite directions, vary slightly in construction according to the loads which they have to carry. Where the loads are considerable, such as in the forward bays, these members are of I-section, built up from flat webs and angle-section flanges. Elsewhere they are plain channels with the free edges turned over for stiffness. The detail sketches on pages 518 and 519 make this clear. The star-shaped plates which form the gussets at the nodal points of the geodetic bars vary slightly in type according to location, but all serve to carry the flange stresses across the cross-over. The webs are riveted to spools situated at the nodal points, as shown in sketches 1, 2 and 3.

In the structural design of the wings of the Vickers Wellesley, the main "theme" is that bending loads are carried by a single main spar located in the deepest part of the wing section, while torsional stiffness is provided by the geodetic members. Of wing ribs in the ordinary sense there are none, the fabric being attached by a special method to the flanges of the geodetic bars, and consequently divided up into a large number of diamond-shaped panels. The single-spar arrangement is used in the outer wing portions only, and even here there are false leading and trailing edge spars of lighter construction.

### *Converging Spars*

In the wing centre-section there are two main spars, spaced about three feet apart at the root, where they are bolted to the fuselage spar frames. These spars meet at their outer ends, to merge into the single main spar of the outer wing portions. The arrangement is well shown in the sketches on page 521, which also illustrate the constructional details.

The main spars have booms of duralumin tube machined on the outside so as to leave a larger diameter and wall thickness where attachment of other members occurs. The spar braces are also tubular and are attached to the booms by flat plates. The false spars at leading and trailing edges have tubular booms, but the braces are of channel section, as the stresses in them are lower than in the braces of the main spar. Joints are made in the false spar booms at fairly short intervals, thus breaking up the geodetic bracing into a series of self-contained panels. The joints are of the same ferrule type as that used in the fuselage longerons.

An unusual type of joint is employed at the points where the converging main spars of the centre-section meet the single main spar of the outer wing portions. To spread the concentrated loads at these points over a large area, fishplates with their inner faces serrated are bolted through the spar booms. The plugs in the ends of the booms are similarly serrated. The vertical bolts through the booms prevent the plates from "riding up" on the serrations, so that shear loads are removed from the bolts and transferred to the serrations. Sketches A and B on page 521 show the details.

The leading edge is covered with sheet metal and hinged to permit inspection of the wing interior.

Reference has previously been made to the fabric covering of the Wellesley. The attachment is by wires and special tape into the edges of which cord has been woven. The tape follows the flanges of the geodetic bars, and the wire, running along the centre of the tape, is either stitched down or held down by special small bolts, through the shank of which the wire passes. When pulled down either by the stitches or by the bolts, the wire lies snugly between the corded edges of the tape and grips the fabric so that the load is distributed instead of being concentrated on the stitch points. The arrangement is neat and extremely strong.

It goes without saying that in a machine designed to be very "clean" aerodynamically a retractable undercarriage is used. The Dunlop wheels are carried on Vickers oleo-pneumatic shock-absorber struts and retraction is sideways, towards the fuselage, so that when retracted the wheels lie between the two main spars of the wing centre-section. The position of the undercarriage is shown at any moment by a Smiths indicator. The undercarriage, by the way, is operated hydraulically.

(*Continued on page 523.*)

The external bomb containers may be seen in this view. In the twin-engined Wellington, stowage is internal.

Trailing-edge flaps are fitted on the inner portions of the wings and are operated hydraulically. The ailerons are of the Bristol-Frise type.

The standard power plant of the Wellesley is the Bristol Pegasus engine, series XX. It drives a three-bladed variable-pitch airscrew, sometimes a De Havilland and sometimes a Rotol. The petrol is carried in several tanks distributed in the wings, with a service tank in the pilot's cockpit. The service tank has a capacity of 16 gallons, and the four main tanks have between them a capacity of 254 gallons. These provide the normal range. For long-range work (in the service sense, of course, and not for record-breaking purposes) extra tankage is installed in the outer wings.

Approximately level with, but well above, the leading edge of the wings is the pilot's cockpit, with transparent enclosure and a fairing behind the pilot's head. The cockpit for the rear gunner communicates with the bomb-aimer's position in the nose of the fuselage by means of a passageway under the footboards of the pilot's cockpit.

Two machine guns provide the defensive armament: a Lewis gun in the rear cockpit and a fixed gun built into the inner wing on the starboard side. Offensive armament in the form of bombs is carried in special nacelles underneath the outer wing portions.

The Wellesley is, of course, equipped with two-way wireless, and provision is made for flotation bags in the wing roots near the fuselage.

# THE ROYAL AERO CLUB

## *Official News and Notices for* *Week Ended December 3*

### *Regulations Increase Opposed*

LIGHT aeroplane clubs from all over the country are strongly opposed to any further increase in the regulations governing club and private flying.

At a meeting of the Executive Committee of the General Council of Associated Light Aeroplane Clubs during the week there was an almost unanimous expression of opinion by the clubs that the present regulations governing low flying are adequate. It was argued that if they are properly enforced there is a sufficient guarantee of the safety of life and property. Further amendments, it was stated, might interfere with the training of pilots, which is now a matter of national importance.

These views are being forwarded to the Committee now sitting under the chairmanship of Lord Gorell.

### *Gliding Goes Ahead*

THREE new gliding clubs, Oxford, Bristol and Surrey, put their claims to the receipt of subsidy before the Subsidy Committee of the British Gliding Association and the Gliding Subsidy Trustees at meetings held at the Royal Aero Club. One club, the Oxford University and City G.C., made it known that although it was only started in June, its members have now secured nearly 70 Gliding Certificates.

### *Still More C.A.G.s*

SIX new Civil Air Guard units are proposed in applications now being considered by the Commissioners of the Civil Air Guard in consultation with the General Council of Associated Light Aeroplane Clubs.

### *Club Insurance*

AN invitation issued to the various aviation insurance underwriters to meet the Executive Committee of the General Council of Associated Light Aeroplane Clubs has been declined.

The problem of arriving at a basis of insurance satisfactory to the clubs is now being undertaken by the General Council.

### *Deauville Rally, 1939*

REPRESENTATIVES of the Royal Aero Club—Mr. Lindsay Everard, M.P., Capt. K. Bartlett and Mr. H. E. Perrin—met the delegates from the Deauville Aero Club in Paris on November 27 and completed arrangements for the Rally to take place in Deauville on July 15, 1939. At this meeeting, Mr. Lindsay Everard, on behalf of the British private owners who attended Deauville this year, presented silver cigarette boxes to M. André, M. Fossorier, the Mayor of Deauville, M. Arnaud Esders, the President of the Deauville Aero Club, and M. Olivier.

### *European Air News*

*France.*—The pylons supporting H.T. cables crossing the Loire at Les Grouets are marked at night by red and white lights placed vertically as well as horizontally. The wires themselves are marked by red neon tubes.

*Germany.*—Darmstadt aerodrome: Airmen approaching this aerodrome should watch for gliders and towing aircraft and apparatus. Two landing crosses may be displayed on the aerodrome. Power-driven aircraft should land near the *white* cross, leaving the *yellow* cross for gliders.

*Hungary.*—Flight above the territory of the town of Kassa (Kosice) within a raidus of 7 km. from the centre of the town is temporarily prohibited. Kassa aerodrome, may, however, be approached along the Hidasnemeti-Kassa railway, subject to prior permission.

*Malta.*—Taqali aerodrome: Owing to heavy rainfall the aerodrome should not be used by aircraft either exceeding 10,000lb. gross weight or which have tyre pressures exceeding 38lb./sq. in.

*Poland.*—Grodno aerodrome has been reopened for public use.

### *Aviators' Certificates*

| No. | Name. | School or Club. | Date. |
|---|---|---|---|
| 16,591 | James Arthur George ... ... | Romford ... ... | 24.11.38 |
| 16,592 | Albert Walter Mascall ... ... | Southend ... ... | 21.11.38 |
| 16,593 | Margaret Wyndham Gore ... ... | Romford ... ... | 24.11.38 |
| 16,594 | John Jassman Dykes ... ... | Brooklands ... ... | 21.11.38 |
| 16,595 | Hector Campbell ... ... ... | Redhill ... ... | 12.11.38 |
| 16,596 | George Henry Hinton ... ... | Northern Aviation ... | 10.11.38 |
| 16,597 | Horace Stanley Bowman ... ... | Bournemouth ... ... | 18.11.38 |
| 16,598 | Robert Leslie Paine ... ... | Malling ... ... | 23.11.38 |
| 16,599 | Randall Murray Bertram Ward ... | I.O.W. ... ... | 3.11.38 |
| 16,600 | John Howard Weaver ... ... | London ... ... | 21.11.38 |
| 16,601 | Alfred Leslie Crampton Chalk ... | London ... ... | 22.11.38 |
| 16,602 | Kenneth Edward Kemp-Turner ... | London Air Park ... | 23.11.38 |
| 16,603 | Frederick George Clifton Downes... | Hampshire ... ... | 17.11.38 |
| 16,604 | Edward Banks ... ... ... | Malling ... ... | 24.11.38 |
| 16,605 | Cecil Raymond Greenhill ... ... | Romford ... ... | 23.11.38 |
| 16,606 | John Warren Collins ... ... | Redhill ... ... | 20.11.38 |
| 16,607 | Henry John Howard Heaton ... | Redhill ... ... | 24.11.38 |
| 16,608 | Sidney Edwin Saunders ... ... | Redhill ... ... | 24.11.38 |
| 16,609 | Charles Taylor ... ... ... | Northern Aviation ... | 25.11.38 |
| 16,610 | Samuel Geoffrey Treasure ... ... | Bristol & Wessex ... | 24.11.38 |
| 16,611 | Edward Morkam Trounson ... ... | Bristol & Wessex ... | 26.11.38 |
| 16,612 | Edward James Egan ... ... | London Transport ... | 26.11.38 |
| 16,613 | Maurice Goring Benge ... ... | Witney & Oxford ... | 16.11.38 |
| 16,614 | Robert Douglas Atkins ... ... | Kent ... ... ... | 24.11.38 |
| 16,615 | William Denys Crew ... ... | Bedford... ... ... | 28.11.38 |
| 16,616 | Arthur Geoffrey Sowman ... ... | Portsmouth ... ... | 23.11.38 |
| 16,617 | Stanley Pace Watkins ... ... | Portsmouth ... ... | 21.11.38 |
| 16,618 | Fritz Miller ... ... ... ... | Portsmouth ... ... | 26.11.38 |
| 16,619 | William James Leslie Longland ... | Romford ... ... | 28.11.38 |
| 16,620 | William Fullerton ... ... ... | Scottish (Renfrew) ... | 26.11.38 |
| 16,621 | John D'Arcy Waechter ... ... | Surrey Flying Services | 28.11.38 |
| 16,622 | Thomas Peel Murray Lees ... ... | Eastbourne ... ... | 22.11.38 |
| 16,623 | Cecil Frank Baker ... ... ... | Eastbourne ... ... | 22.11.38 |
| 16,624 | Jack Kenneth Ross ... ... ... | Redhill ... ... | 4.11.38 |
| 16,625 | Frederick Charles Mackenzie ... | Redhill ... ... | 29.11.38 |
| 16,626 | Geoffrey Wilfred Foley ... ... | Herts & Essex ... | 29.10.38 |
| 16,627 | Ivor Morgan ... ... ... ... | Herts & Essex ... | 26.11.38 |
| 16,628 | Ernest Joseph Denman Willows ... | Hampshire ... ... | 27.11.38 |
| 16,629 | Donald Currie Mirrielees ... ... | Cinque Ports ... ... | 29.11.38 |
| 16,630 | William Osmond Stokes ... ... | Tollerton ... ... | 28.11.38 |
| 16,631 | Donovan Pax Chaldecott ... ... | Air Service Training ... | 28.11.38 |
| 16,632 | Neville Gordon Baxter ... ... | Yorkshire ... ... | 28.11.38 |
| 16,633 | Robert Story Glen ... ... ... | — | 5.11.38 |
| 16,634 | Gerald Spencer Barrett ... ... | De Havilland F.T.S. ... | 22.11.38 |
| 16,635 | Alan Burnett Rae ... ... ... | Herts & Essex ... | 29.11.38 |
| 16,636 | Charles Robert Ashby ... ... | Norfolk & Norwich ... | 30.11.38 |
| 16,637 | Richard Alexander Gliddon ... | Plymouth ... ... | 24.11.38 |
| 16,638 | Geoffrey Keighley ... ... ... | Liverpool ... ... | 22. 8.38 |

"FLIGHT" NEXT THURSDAY: AIRCRAFT CONSTRUCTION NUMBER

# SERVICE AVIATION

*Royal Air Force and Official Announcements : Fleet Air Arm News : Military Aviation Abroad*

**A SULTAN'S GIFT : One of the four Short Sunderlands (left) purchased with a gift of £300,000 from the Sultans of the four Federated Malay States was recently named *Pahang* by the Sultan of Pahang, who is seen in the photograph above, taken at the ceremony. On the left is the British Resident, Pahang, Mr. G. C. Brown, and on the right is A. V.-M. J. T. Babington, A.O.C., Far East. The boats are being operated by No. 230 (G.R.) Squadron. Some new facts about the Sunderland appear below.**

## *Air Ministry Appointments*

GROUP CAPT. ROBERT DICKINSON OXLAND has been appointed Director of Personal Services, Air Ministry, with effect from December 28. He succeeds A.V-M. Owen Tudor Boyd.

Group Capt. Oxland, who is 49, was appointed in 1927 chief instructor at No. 2 Flying Training School. In 1930 he was posted to headquarters, Wessex Bombing Area, for Air Staff duties, and in 1932 joined the Operations Staff at Iraq Headquarters. In 1934 he was appointed to the Air Ministry for service in the Directorate of Operations and Intelligence.

Sir Kingsley Wood, the Air Minister, has appointed Mr. F. Wood to be one of his Assistant Private Secretaries in succession to Mr. R. C. Chilver.

## *New F.T.S.*

NO. 12 Flying Training School formed at Grantham on December 1. Before the expansion began this station accommodated No. 3 F.T.S., now at South Cerney. For a while Grantham was the home of Nos. 113 and 211 (Bomber) Squadrons, which were moved to Heliopolis and Helwan respectively a few months ago. Group Capt. C. L. King, M.C., D.F.C., is commanding officer of the new F.T.S.

## *Recruiting Doubled*

A TOTAL of 736 recruits joined the Royal Air Force during the week ended November 26, compared with 308 in the corresponding week of last year. This brings the total acceptances of pilots, observers, airmen and boys since April 1, 1938, to 20,685, as compared with 10,238 for the corresponding period of last year.

The 736 acceptances in that week were made up of 27 pilots and observers, and 709 airmen.

## *Hurricanes for South Africa*

ON his return to Capetown from London last week Sir Pierre van Ryneveld, Chief of the General Staff of the Union, said that Mr. Pirow and he had been successful in their mission to Great Britain and that so far as arms and equipment were concerned the Union Defence Force was well on its way to self-sufficiency. He added that a flight of seven Hawker Hurricane eight-gun fighters would shortly be added to the Air Force.

## *Long-range Wellesley Damaged*

WELLESLEY No. 1 of the Long-range Development Unit was badly damaged in a forced landing near Richmond, New South Wales, last week. The machine hit the ground with some force, bounced, ploughed through a fence and skidded for about fifty yards, tearing off the wheels, buckling the undercarriage and damaging the engine and one of the wings. Sqn. Ldr. Kellett being in hospital, the machine was being flown by Flt. Lt. Gething who, like the rest of the crew, was badly shaken but unhurt.

## *The Short Sunderland*

IT is comforting to know that the R.A.F. has a considerable number of long-range military flying boats in service which, so far as can be ascertained, are equal in effectiveness to experimental prototypes in France and America. The machines concerned are of the Short Sunderland type, the first details of which are given hereafter.

The Sunderland is virtually the military conception of the Empire flying boat as developed for Imperial Airways and retains most of the structural features of the civil type, although the design has been varied very considerably, particularly in the hull. The rear step, for example, has been completely redesigned.

The main wing spar is a braced rectangular structure of light-alloy extruded sections. With the exception of the ailerons, the whole of the wing is covered with smooth metal sheeting with joggled lap joints and flush riveting In view of the success attained on Empire boats, the flaps are of the Gouge dragless type, electrically operated, which provide increased wing area in addition to giving the normal flap effect.

The hull is extraordinarily deep and is divided into an upper and lower deck. In the bow is a power-operated gun turret, beneath which is the bomb aimer's position and stowage for mooring equipment. The turret is arranged to slide aft to permit mooring operations. On the upper deck aft of the bow compartment is the pilot's cabin, which has side-by-side dual controls and is accessible by a communicating ladder from the lower deck. Aft of the pilot's cabin, on the port side, is the wireless operator's station, and on the starboard side the navigator's seat and table and a position for the engineer. Below the pilot's cabin is the wardroom and the lavatory. The galley, which also serves as a drogue-operating station, is partitioned from the wardroom. There is a ladder from the galley to the engineer's compartment. Aft of the galley are two compartments for the crew, the forward housing the main bomb load. Farther aft, approximately on a level with the upper deck, is the platform for the midship gun stations. In the extreme tail is another power-operated turret similar to that in the bow and accessible by a catwalk in continuation of the main flooring.

### Short Sunderland Data

| | |
|---|---|
| **DIMENSIONS.** | |
| Span | 112 ft. 9½ in. |
| Length | 85 ft. 4 in. |
| Height (on beaching chassis) | 32 ft. 1½ in. |
| Main plane area | 1,487 sq. ft. |
| **WEIGHTS.** | |
| Weight empty | 28,290 lb. |
| Petrol (normal load) 1,520 gal. | 11,400 lb. |
| Oil (normal load) 92 gal. | 830 lb. |
| Service load plus crew | 5,180 lb. |
| Normal all-up weight | 45,700 lb. |
| Overload petrol 2,034 gals. | 15,250 lb. |
| Overload oil, 128 gals. | 1,150 lb. |
| Overload all-up weight | 49,870 lb. |
| **PERFORMANCE (Normal Load).** | |
| Maximum speed | 210 m.p.h. at 6,250 ft. |
| Maximum cruising speed (normal r.p.m.) | 178 m.p.h. at 5,750 ft. |
| Minimum flying speed | 80 m.p.h. |
| Rate of climb—sea level | 1200 ft./min. |
| Service ceiling | 20,500 ft. |
| Time to take off (10 m.p.h. wind) | 23 sec. |
| Normal range still air | 1,670 sea miles |
| Overload range still air | 2,500 sea miles. |

# SERVICE AVIATION (CONTINUED)

The four engines are of the Bristol Pegasus XXII type, rated at 810/850 h.p. at 7,250 r.p.m. at 4,000ft. and giving a maximum output for level flight of 875/915 h.p. at 2,600 r.p.m. at 6,250ft. The take-off power on fuel of 87-octane number is 970/1,010 h.p. at 2,600 r.p.m. The airscrews are three-bladed, two-pitch De Havillands of 12ft. 9in. diameter.

The engine controls are operated by the Exactor hydraulic system. Fuel is carried in three light-alloy tanks on each side, and within the main planes provision is made to jettison 52 per cent. of the maximum fuel capacity. Oil tanks are situated in the engine nacelles. An auxiliary power unit for refuelling, bilging and accumulator charges is mounted in the leading edge of the starboard main plane.

## How to Join the R.A.F.

THE Air Ministry has issued the following directions for helping those who wish to join the R.A.F.:—

Inquiries received as to the methods of joining should be dealt with as follows:—

(i) For commission:—The inquirer should be informed that full particulars will be given on application to the Under Secretary of State, Air Ministry, S7(e), Adastral House, Kingsway, London, W.C.2.

(ii) For enlistment:—(a) As direct entry air observer: The inquirer should be informed as above.

(b) As skilled, semi-skilled or unskilled recruit:—The inquirer should be furnished with the illustrated booklet "Royal Air Force—A Life for Men" and referred to the nearest recruiting office for more detailed information.

(c) If the inquirer is an ex-airman, Air Force reservist or Air Force pensioner, he should be referred to the Officer i/c Records, Ruislip.

(d) As aircraft apprentice, apprentice clerk, or boy entrant:—The inquirer should be informed that full particulars will be supplied on application to the Inspector of Recruiting, Royal Air Force, Victory House, Kingsway, London, W.C.2.

Supplies of the illustrated booklet should be obtained from the Air Publications and Forms Store. The following recruiting offices have been established and any changes therein or additions thereto will be notified in Air Ministry Orders:—London—Victory House, Kingsway, W.C.2. Aberdeen—62, Market Street. Birmingham—55, Cornwall Street. Belfast—46, Ann Street. Bristol—91, Victoria Street. Blackburn—1, Preston New Road. Sudell, Cross. Brighton—93, Queens Road. Birkenhead—78, Argyle Street. Cardiff—Dominion House, Queen Street. Carlisle—41, Botchergate. Coventry—7, Bishop Street. Derby—55, Osmaston Road. Edinburgh—57a, Home Street, Tollcross. Exeter—No. 3 Shop, Central Station. Glasgow—10, Bothwell Street, C.2. Hull—87, Prospect Street. Inverness—26, Church Street. Ipswich—3a, Norwich Road. Leeds—7, Cabinet Chambers, Basinghall Street. Leicester—101, London Road. Liverpool—79, Lime Street. Lincoln—143, High Street. Manchester—11, Peter Street. Middlesbrough—89, Grange Road. Newcastle-on-Tyne—153, Pilgrim Street. Northampton—49, Abington Street. Norwich—71, Prince of Wales Road. Nottingham—15, Trinity Square. Newport, Mon—118, Commercial Street. Plymouth—12, Buckland Terrace, Millbay Road. Portsmouth—10, Pearl Buildings, Commercial Road. Reading—1, Station Approach. Southampton—4, London Road. Sheffield—8, West Street. Shrewsbury—8, Castle Gates. Stoke-on-Trent—48, Pall Mall, Hanley. Swansea—6, Plaza Buildings, Picton Place. Sunderland—9, High Street West.

## Air Force Artists' Work Exhibited

THE fourth annual exhibition of the Air Force Artists' Association was opened last Monday by H.R.H. the Duchess of Kent at The Building Centre Galleries, 158, New Bond Street, London, W.1.

This year's exhibition (writes a critic) is very alive and the general standard of work is high. In contrast to previous years there are many flying subjects; some of these are somewhat retrospective, dating back to the war period, but it is pleasant to meet among them the graceful charm of Air Comdre. Roderic Hill's water colours. To this group also belong "The Clouds Remember" series by Leonard Bridgman. What innocent toys were these machines of war compared with the purposeful designs of to-day! More modern types, however, are not forgotten, Hurricane, Anson, and Audax having their rightful place.

The pencil sketches of Lt. Col. Harold Wyllie of the Rhine, of clouds and of aerial combats are good personal impressions of the war from actual service with the Air Force. Admiral Mark Kerr exhibits a series of water colours. Capt. R. C. Preston is interesting in his impressions from the air and G. M. Stephenson exhibits some bold and strong work. Lady Trenchard is amongst the exhibitors. Photography and other classes of art and crafts are well represented. W. Russell Flint, R.A., P.R.W.S., will be judge for awards of diplomas.

## Flying Accidents

THE Air Ministry regrets to announce the following flying accidents—

P/O. Peter Rodney Wood (pilot) lost his life in an accident which occurred at Driffield, Yorkshire, on November 24, to an aircraft of No. 77 (Bomber) Squadron. Sgt. Thomas Gilbert Mahaddie, the other member of the crew, was slightly injured.

P/O. Henry Granville Hudson (flying solo) lost his life in an accident which occurred near Jerusalem on November 25 to an aircraft of No. 33 (Fighter) Squadron, Ismailia, Egypt.

P/O. John Ellis (pilot) lost his life, A/C.2 Victor Douglas Rawlings was dangerously injured, and Cpl. Arthur Robert James Thorogood was seriously injured in an accident which occurred at East Tisted, Alton, Hants, on November 25 to an aircraft of No. 63 (Bomber) Squadron, Upwood, Huntingdon.

Sgt. Edward Watkin-Thomas (flying solo) lost his life in an accident which occurred at Holmepierrepont on November 27 to an aircraft of No. 27 Elementary and Reserve Flying Training School, Nottingham.

# Royal Air Force Gazette

## Royal Air Force

*General Duties Branch*

Air Comdre. W. A. McClaughry, D.S.O., M.C., D.F.C., is appointed Director of Training, Air Ministry, vice Air Comdre. Robert Leckie, D.S.O., D.S.C., D.F.C. (November 28).

The following are promoted (November 1):—

WING COMMANDERS TO BE GROUP CAPTAINS.—R. J. Mounsey, O.B.E.; E. A. B. Rice, M.C.; W. B. Hargrave, O.B.E.; O. G. W. G. Lywood, C.B.E.; C. R. Carr, D.F.C., A.F.C.; R. W. Chappell, M.C.; A. H. Wann.

SQUADRON LEADERS TO BE WING COMMANDERS.—D. O. Mulholland, A.F.C.; E. A. Beaulah (acting Wing Commander); A. H. Stradling, O.B.E.; F. R. Alford, M.C. (acting Wing Commander); R. S. Booth, A.F.C.; R. Jope-Slade, O.B.E., D.S.C. (acting Wing Commander); D. W. Clappen; E. H. Hooper; V. R. Gibbs, D.S.C.; C. H. C. Woollven, M.C.; D. R. W. Thompson.

F/O. J. A. H. Tuck is promoted to the rank of Flight Lieutenant (October 31).

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—H. L. I. Brown (September 5); J. C. Mayhew (September 26); P. A. Lombard (October 15); R. C. Ayling (November 16).

The following Flying Officers relinquish the acting rank of Flight Lieutenant on the dates stated:—J. F. Walker (October 18); K. J. Mellor (November 18).

Capt. T. O. Bulteel, R.N., Wing Commander, R.A.F., ceases to be attached to the Royal Air Force on return to naval duty (August 5).

*Medical Branch*

Flt. Lt. (Quartermaster) W. King is promoted to the rank of Squadron Leader (August 9); F/O. (Quartermaster) J. Holt is promoted to the rank of Flight Lieutenant (September 8).

## Princess Mary's Royal Air Force Nursing Service

The following Staff Nurses are appointed to the permanent service (November 1): Miss R. D. Dryden, Miss U. H. Mackenzie.

## Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

*General Duties Branch*

Sqn. Ldr. N. W. A. Cullum relinquishes his commission on appointment to a commission on the Unattached List for the Indian Army and is permitted to retain his rank (August 5); Flt. Lt. D. W. H. Gardner relinquishes his commission on appointment to the Air Branch of the Royal Navy (September 20); Flt. Lt. J. R. L. Rumsey relinquishes his commission on appointment to a commission on the Unattached List for the Indian Army (September 24).

## Royal Air Force Volunteer Reserve

*Medical Branch*

F/O. C. M. Dransfield, M.R.C.S., L.R.C.P., is promoted to the rank of Flight Lieutenant (July 21).

## Auxiliary Air Force

*General Duties Branch*

No. 902 (COUNTY OF LONDON) (BALLOON) SQUADRON.—Sqn. Ldr. J. J. O'Hea relinquishes his commission and the command of the Squadron (November 12).

No. 910 (COUNTY OF ESSEX) (BALLOON) SQUADRON.—A. M. Lyons, K.C., M.P., J.P., is granted a commission as Squadron Leader and appointed to the command of the Squadron (July 5).

*Medical Branch*

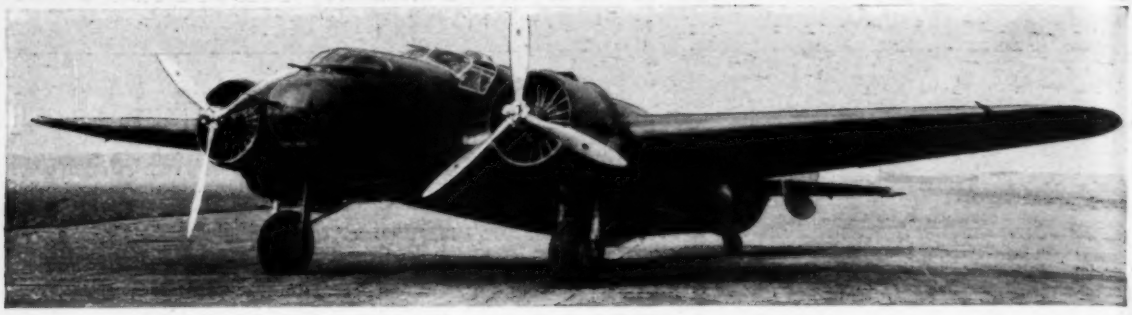
No. 501 (COUNTY OF GLOUCESTER) (BOMBER) SQUADRON.—Flt. Lt. F. G. Mogg, M.R.C.S., L.R.C.P., is promoted to the rank of Squadron Leader (May 1).

*General List*

Sqn. Ldr. H. Peake is appointed to the General List in that rank, with effect from November 1, on relinquishing the command of No. 609 (West Riding) (Bomber) Squadron, and is granted the acting rank of Air Commodore with effect from November 14.

*Owing to the greatly increased length of these lists, as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.*

**Service Aviation (contd.): Foreign News**



**FIAT-POWERED: A recent version of the Italian Caproni Ca.135 twin-engined high-speed bomber fitted with two Fiat A.80 two-row radials giving 1,000 h.p. each at 13,500ft. The top speed is said to be about 290 m.p.h. The front gun mounting is interesting but must of necessity give a limited field of fire.**

## *French Expansion—*

ACCORDING to a French correspondent the strides lately made by French military aviation are greater than is commonly believed. In the words of this correspondent "it seems at least—and at last—that the French have realised the sorry state of affairs into which M. Pierre Cot had led them."

Fortunately the period of general anxiety in September enabled the French to take stock of what they had and to confront their forces with the air power of Germany. Many Frenchmen who, until then, had had no direct information about French service flying aviation found themselves mobilised, in most cases as Reserve officers. Through conversation with their comrades in the air force they suddenly realised that the situation was desperate.

M. Guy La Chambre and his General Staff, at the head of which are men of action—Generals Vuillemin and Bousche, both very much feared and respected—have been fighting a long, uphill battle against great odds. The first results of M. La Chambre's policy is already evident. The efficiency of the French factories is said to have gone up more than fifty per cent. from January to September. The Morane Saulnier 405-6 fighter will now be built in four factories, three of them nationalised; the Marcel Bloch 151 bomber will be made in Bordeaux; the Potez 63 twin-engined fighter-bomber will probably treble its present production if lack of accessories does not hinder it; the Lioré 45 bomber will be built in the south east; and Amiot and Bréguet are laying in supplies for the production of the Amiot 340 and Bréguet 650.

That there is a new and happy state of mind in French aviation, and (what is far more important) in political circles is shown by the fact that when the works at Château-Bougon, where Moranes are built, went on strike lately about their holidays, nearly two thousand workers voted in a secret ballot for the resumption of their work, 18 only voting for continuing the strike!

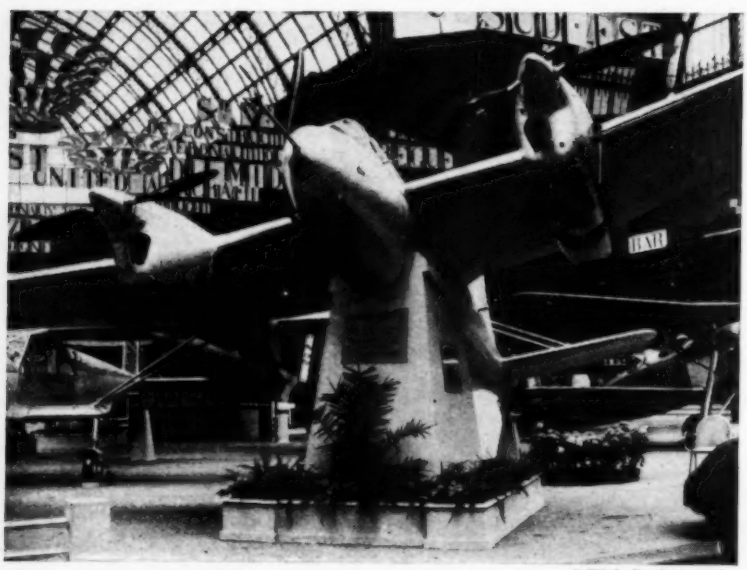
This extraordinary result—99 per cent. of the *ouvriers* desiring to work—has shown that the French workers' mind is fundamentally sound, that the strikes are brought about from the outside by agitators, and it is undoubtedly this that decided M. Daladier and M. Reynaud (in his recent financial speech) to announce measures which will certainly give French production an impetus which it had never known under the political influence of M. P. Cot.

## *—and Scandinavian*

AMONG the Scandinavian countries, Sweden is leading in the endeavour to create a strong air force. In accordance with the expansion scheme within the frame of the five-year industrial development plan the first line of the air force will consist of 260 machines, whilst under the old scheme only 80 were envisaged. The number of training machines will be increased from 40 to 80, and the personnel of the air force from 1,800 to 4,300. To cope with the requirements of the expansion programme, the policy to be followed is on two lines: on the one hand orders for aircraft are being placed abroad and on the other steps are taken to create a well-organised industry at home. Only a short time ago, twelve more three-seater reconnaissance machines of the Breguet 694 type were ordered in France. These are twin-motored all-metal machines with Gnome-Rhône 14Ms of 650 h.p. each, and a maximum speed of about 300 m.p.h., at 13,100ft. Prior to this, 55 Gloster Gladiator fighters were ordered in England in addition to 1 Handley-Page Hampden bomber, whilst an order for 40 Junkers Ju.86 bombers was placed in Germany.

As for the Swedish aircraft industry, there are actually two recently completed aeroplane works: one, the *Svenska Aeroplan Aktiebolaget*, at Trollhättan (an hour's journey by rail to the north of Gothenburg) and the *Aktiebolaget Järnvägsverkstäderna* at Linköping, roughly mid-way between Stockholm and Gothenburg. The first-named is a creation of the well-known Bofors armament works in connection with the locomotive factory Nyqvist and Holm (Trollhättan) which latter also belongs to the Bofors concern. The *Järnvägverkstäderna*, of Linköping—as the name implies—constructs railway rolling stock, but having secured—together with the *Svenska Aeroplan* AB. (Trollhättan)—the monopoly for the manufacture in Sweden of service and training aircraft, they have extended their activities to these important lines. The air force, however, is not satisfied with the existence of only two specialised though large aircraft works and has called forth—in accordance with the Government's desire—tenders from the industry for the creation of further factories, capable of large-scale deliveries of aircraft and spares as from 1941. In response, one of the most important shipbuilding and ship-repairing yards in Sweden—in fact, the biggest in the whole of Scandinavia—the *Götaverken Aktiebolaget*, of Gothenburg, has submitted a project for creating a big factory for the supply of aeroplanes and engines. Various other projects are also being considered.

Denmark, too, is alive to the burning question of creating a source of supply of aircraft and spare parts independent from foreign deliveries and only very recently the Danish Minister for War put forward a financial scheme (adopted in the meantime by the Finance Civil Committee) for the allocation of half a million Danish Kroner (app. £22,700) for the purpose of taking steps towards the establishment of an aeroplane works in Denmark.



*"Flight" photograph.*

## *The Shaft-Drive Koolhoven*

IT was gathered on the Koolhoven stand at the Paris Show that the Koolhoven F.K. 55 single-seater fighter developed from the machine shown in Paris two years ago is flying very well but that difficulties have been experienced in obtaining power plants. The machine is now a high-wing type and is fitted with a Lorraine Sterna engine of 900/1,000 h.p. in place of the original Pètrel.

The top speed is now quoted as 348 m.p.h., the landing speed with flaps being 65 m.p.h. With standard tanks the range at cruising speed is 745 miles. For the time being the F.K. 55 is fitted with a fixed undercarriage, though the wheels are intended eventually to retract into the fuselage.

**TRANSITORY TRAINER: The new Hanriot 232 twin-engined trainer introduced at the Paris Show. A production order has been placed by the French Government. The engines are 220 h.p. Renaults.**

# *Topics of the Day*

## *Once Again*

AT the risk of being taken for a ride by one or other of the long-suffering C.A.G. Commissioners, I am returning once again to the subject—with the preliminary repetition of my statement of a fortnight ago that, remembering the difficulties of the scheme as it stands, the organisers have done very well.

During the past two or three months various people have complained of the fact that they have been, and are being, kept waiting after making necessary applications. Obviously 30,000 odd people cannot be trained all at once, and in due course most of them will probably have their chance. The question is, are the present applicants being selected, or are they just being taken on in rotation?

With due apologies to those clubs which are, on their own initiative, picking and choosing, it must be admitted that the money and time spent on many of the pupils who are getting on towards the upper age limit is entirely wasted. At present, the maximum age at which a healthy young man can be accepted for the Royal Air Force Volunteer Reserve is twenty-five, and it does not matter whether he can already fly, whether he can pass a very strict medical examination, or whether he is in every way suitable—at the age of twenty-six he will usually be turned down. There are exceptions, presumably, to this rule, but it is certainly not likely that the Air Ministry would accept a man, however healthy, who is over the age of forty. Nor will they accept women.

As a reader remarks, "it is pleasant and encouraging to think that Mrs. Jones, who has all her life cherished a secret ambition to fly an aeroplane, is at last, at the age of forty-nine, able to realise this ambition at the expense of the Government." But, as he goes on to say, it is a bit silly when you think that there are thousands of young men of twenty waiting to fly and are, because the waiting list is very long, gradually losing their enthusiasm, while Mrs. Jones does bouncy landings with a weary and patient instructor—who would much prefer to teach an apt pupil.

## *Selection*

SURELY, it should not be left to the individual clubs to decide who will or will not be permitted to start training to-morrow or the next day. The Government and/or the Commissioners should organise a special selection committee which would not act until such a time as everyone can be brought properly and practically into the scheme. As I have said before on a number of occasions, this scheme is working the wrong way round in that all sorts of people are given the chance to fly ten hours a year, while the man or woman who has already done some flying, and is equipped to start more advanced work, is ignored.

What ought to be done, of course, is to collect, first of all, those people who are well on the way towards flying efficiency, and to teach them something of advanced navigation, blind-flying and aerobatics—the three items which the amateur rarely has the time or the money to learn.

At normal club rates it always seems to be a rather expensive business to take a course, say, of under-the-hood flying when the money can much more pleasingly be spent in floating gently around the sky. Aerobatic training and, more particularly, blind-flying training, can be very hard work indeed, and should be done thoroughly if at all. No one can become a really good aerobatic pilot in much less than ten hours of concentrated, strenuous instruction.

To repeat *ad nauseam*—forget for a moment the possible publicity value of the C.A.G. scheme for flying in general—what is wanted at this moment is a reserve of pilots instead of a reserve of half-trained and largely unsuitable people. It would be better for the first year to concentrate on making really good pilots out of a thousand amateurs, than in making pseudo-pilots out of ten thousand beginners.

## *Women With Wings*

ANOTHER correspondent, this time anonymous, wants to know what I think about the position of women in the C.A.G. scheme. Until now I have tried to steer clear of this subject, since it is entirely mixed up with the still doubtful reasons for the institution of the scheme. If this is one merely for the production of a useful reserve of pilots, then the attitude of the Government must change before women can be considered as being really useful recipients of any form of subsidy. Rightly or wrongly, this country has not yet accepted the principle that women should be exposed to fighting risks.

There is already a nucleus of thoroughly efficient and effective women "A" and "B" licensed pilots, one or two of whom are doing a good job of work. In case of emergency there is no doubt that those who have the real experience will be extremely useful, and even those who have put in the first year's allowance of ten hours will be more valuable on various types of work.

But there is far too much loose talk about the actual flying work which can be done by anybody of small air experience, whether man or woman, and the majority of individuals talk vaguely about the necessity for a supply of pilots to ferry aeroplanes, and so relieve more experienced pilots who should be on the job of actually being killed. But it is one thing to fly a Gipsy Moth or Tiger Moth and quite another to go straight on to a Blenheim or a Battle.

Even the types used for communication work are generally fairly advanced and are likely to be even more advanced in the future. One cannot step straight out of a Tiger and fly, for instance, a D.H. Don, with flaps, retractable undercarriage, and constant-speed airscrew, not to mention wheel control and central throttle. If non-flying people got out of their heads the idea that a pilot is just a pilot, regardless of his or her experience, there would be a better understanding of the whole problem.

INDICATOR.

***Private Flying***

# FROM the CLUBS and SCHOOLS

### LONDON

LAST week 65 hr. 15 min. made up the flying total, and Mr. J. H. Balmer completed his "A" licence tests. Mr. E. Pugliese has become a member.

### THANET

Last week was one of good weather and 49 hours were flown. Miss N. Avery and J. T. Lean made their first solos.

### EDINBURGH

Twenty-three hours' flying was separately recorded in both the C.A.G. and the club section, although high winds and gales had rather handicapped flying.

### NEWCASTLE-ON-TYNE

Bad weather was also experienced at Newcastle and only 12½ hr. were flown by club and 38½ hr. by C.A.G. members. Mr. G. Bainbridge made his first solo.

### LEICESTERSHIRE

A Christmas dance, which will be rather in the nature of a Christmas party, will be held in the clubhouse on December 16 from 9 p.m. Tickets can be obtained from the Secretary.

### NORTH BRITISH

Mr. J. S. Ramsay has the distinction of making the first solo flight in the C.A.G. section of the North British Aero Club. Despite bad weather cancellations, the C.A.G.s are averaging over 20 hr. weekly.

### BORDER

The soft nature of the aerodrome surface has caused flying training to come to a standstill, preventing instruction in landings and take-offs, and "A" licence candidates are necessarily waiting to take their tests.

### WITNEY AND OXFORD

At the end of the first three months of C.A.G. training, 48 Civil Air Guards are flying and 8 "A" licences have been accounted for. Mr. C. K. Jones made his first solo, and flying for December totalled 52 hr. 55 min.

### WESTON-SUPER-MARE

Flying was curtailed towards the end of the week because of a wet aerodrome surface, though it is dry in comparison with the surrounding fields, which are deeply flooded. Flying time for last week totalled 30 hours.

### HANWORTH

Four people made their first solos; they were Messrs. J. Coxall, B. Templar, S. Woodington and Capt. Brook-Williams. Messrs. Van Hulzen and P. E. Adams completed their "A" licence tests, and a total of 96 hr. was flown.

### READING

Contrary to the general run, weather has been good at Reading. A cross-country flight was made to Yeovil and Mr. V. Motion took the Whitney Straight to Bristol. Mr. J. Andrews made his first solo flight as a C.A.G. member.

### ROMFORD

Because of foggy weather only 35 hr. dual instruction was possible. Nevertheless, "A" licences were obtained by Dr. Keithley, Messrs. A. McKay and E. Yates, while Mr. A. Reid and Miss Weekes went solo.

### PLYMOUTH

The aerodrome surface has kept fairly dry owing to its natural "camber." Flying time for the week amounted to 28 hours. G. W. C. Harding and R. A. Gliddon obtained their "A" licences and H. A. Spray made his first solo.

### CINQUE PORTS

On Saturday an oyster party was held and had great support. The club will be closed from December 25 to 27, inclusive. Mr. R. Giles has qualified for his "A" licence as a member of the C.A.G. and the flying total for the week was 60 hr.

### MARSHALL'S

In the C.A.G. section of the school, Mr. S. A. Roper made his first solo flight and Miss Canning and Mr. D. White obtained their "A" licences. In the school itself, a total of 88 hr. 40 min. flying was recorded and Mr. Clapin made his first solo.

### SOUTH COAST

A tramps' party was held at the club on Saturday. It was rather ironical when Mr. L. Bellairs, a real hard-case "gentleman of the road," ordered his Whitney Straight to be ready for him next morning. Parties arrived from Redhill and Brooklands.

### IPSWICH

Weather was fairly good last week, and there was a further marked increase in flying. The week's total was 34 hours.

In the issue of November 24, incidentally, the hourage figure was given as being for *three* weeks; actually, it was, of course, for one week only.

### BEDFORD

Although bad weather somewhat curtailed flying last week, 198 hr. 45 min. were put in and cross-country flights to Broxbourne and Sywell were made. Four "A" licences were obtained, Messrs. E. D. Crew, W. D. Crew, R. I. Sworder, and J. E. Marshall being the successful candidates.

### HERTS AND ESSEX

There was a good deal of fog at Broxbourne during the fortnight ended September 1, and flying was possible on only ten days. Nevertheless, the club's total was 98 hr. 20 min. Miss M. E. Stuart made her first solo, and Messrs. P. E. Hindmarsh and I. Morgan completed their "A" licence tests.

### STRATHTAY

November has been the poorest flying month since the club began, only 53 hr. being recorded. Mr. A. J. S. Stewart made his first solo, but in view of the extremely bad weather, no members have been able to carry out their "A" tests. The annual ball was held on November 25 and was a great success.

### BRISTOL AND WESSEX

For the week ended December 3, 57 C.A.G. enrolments were received, and lectures in that section started on December 6. Messrs. T. McCowat, P. Shinner and A. H. Townsend made first solos, and Messrs. S. G. Treasure, E. M. Trounson and A. P. West completed "A" licence tests. Flying for November amounted to 86 hr. 5 min.

### PORTSMOUTH

The Civil Air Guard members have made rapid progress at Portsmouth and up to December 3, 615 hr. 25 min. have been flown since the inauguration. Thirty-nine members are flying solo and 116 are under instruction. The applicants for enrolment total 509. Ten "A" licences have been issued. Club flying last week totalled 69 hr. 5 min.

### YAPTON

Nearly as rapid progress has been achieved by the Yapton Aero Club, who have flown 306 hr. in the C.A.G. section and have ten members flying solo. The total number of members under instruction has reached 59 with a list of applicants of over 220. Two "A" licences have been issued. Thirty-seven hours fifty-five minutes' flying was put in by the club last week.

### YORK AND LEEMING

C.A.G. flying accounted for 38 hr. of the club total, and the club has taken delivery of a new Gipsy II Moth, which may have accounted for a little more. Mr. S. A. Radcliffe made his first solo and Miss Strickland and Mr. J. H. Perrin finished their "A" licence tests. Messrs. J. H. Chappell and F. Pickersgill have taken up residence at the club.

### EXETER

Last week was one of reduced activity, owing to rough weather and the fact that the aerodrome was very wet. Eleven and a half hours were flown, and R. Hosking and G. K. Pridham made their first solo flights. Mr. Shapley has been flying his "Kittiwake" cabin monoplane, which promises very well. Over 60 people attended a successful club dance on November 22.

### YORKSHIRE

After only 16 flying days in the whole month of November, a total of 204 hr. 45 min. was, nevertheless, recorded. A further Moth has been purchased by the club. About 190 C.A.G. members are now under instruction, several of whom are flying solo. Messrs. P. M. Wood, W. Carr-Birkbeck, N. G. Baxter and N. F. Steadman have obtained their "A" licences under the scheme.

### NORFOLK AND NORWICH

The first of the informal dances held by the Norfolk and Norwich Club this season took place on December 2. One hundred people danced to Bert Priest's band until the small hours. The next dance will be held on New Year's Eve. A snooker competition is also being arranged. A slight increase was noticeable in the C.A.G. section, 21 hr. being flown. Another member made a first solo. Lectures are given on Tuesdays by the chief instructor.

### C.A.S.C.

Although fog in the morning has reduced the flying times, a good attendance of members last Sunday produced over 16 hr. flying at Cambridge. Incidentally, the annual general meeting of the Corps has been called for the second Wednesday in January, when a new committee will be elected. The Corps recently held its annual dance at the Fifth Avenue Hotel, Holborn. It was a most enjoyable evening attended by a large number of the Corps and their guests. Mr. A. G. G. Marshall had come down from Cambridge with a party, while the Corps' old instructor, Mr. G. W. Alexander, now chief pilot of Air Dispatch, had taken a night off from the newspaper service to Paris, to be present with his wife.

### BROOKLANDS

Last week's flying total was 110 hr., in which first solos were made by Capt. Skrine and Mr. Mathieson, and Mr. A. O. G. Connor passed his "A" tests. Other, and perhaps more important, achievements were the passing of the Second Class Navigators' examination by Miss Mona Friedlander, instructional endorsements on the licences of Messrs. Stanway, Levenson, and Hillman, and the obtaining of a "B" licence by Mr. A. Brown. Mr. Cummings is one of the club's new private owners. On Sunday, December 18, a good-will flight will be made to Shoreham if the weather is sufficiently good, and thereafter the club will close down on the evening of December 23 until the morning of Monday, January 2. Normal service will, of course, be available for visiting private owners. A dance is to be held to-morrow at St. George's Hill in aid of the Air Defence Cadet Corps Fund.

(*Reports of two club dinners appear on p.* 531.)

# AIR-MAIL HISTORY

## *The Post Office Contributes to the Fourth of the Series of Brancker Memorial Lectures: Mr. D. O. Lumley Describes Twenty Years' Development*

IN the introduction to his lecture on Tuesday of last week, Mr. D. O. Lumley, O.B.E., the Assistant Secretary of the General Post Office, explained that his paper had necessarily to be "a kind of progress report." In this report, if so it can be called, however, he traced the history of air mail transport from 1919 to 1938, and the lecture must have clarified for a number of people many of the difficult little chronological and other points concerned with the present position of all-up air mail transport.

In his summary Mr. Lumley divided the period into two, with the year 1935-6 forming the dividing line. These two eras are clearly distinguished by the fact that all mails were until 1936 subject to a special charge, while thereafter this surcharge system has been superseded more and more by what, for want of a better term, is called the all-up system.

After tracing briefly the history of extra-European air transport from Imperial Airways' first service between Cairo and Basra in 1927 to the present day, when most of the more obvious air routes had been exploited, the lecturer explained later on that the Post Office could not organise air services, but was merely ready to arrange to send letters by any service which operated regularly and offered a useful acceleration in delivery. In the earlier days, while the Post Office had been seeking to make a profit, the revenue collected had to be sufficient to cover the costs. Subject to this principle, it was their aim to fix the charges at the lowest possible figure.

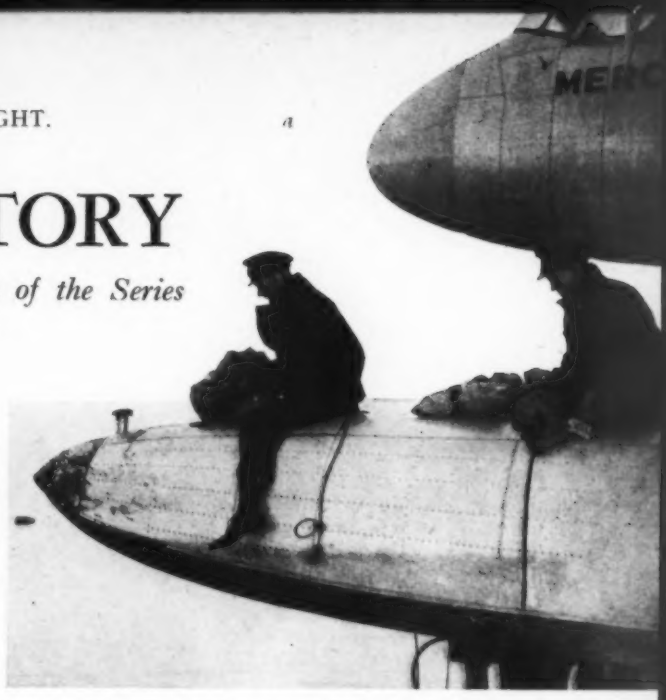
### *Earlier Complications*

Until comparatively recently the charges for different parts of the world were somewhat complicated. Although for European services the ounce unit had been maintained, and for the longer extra-European services the half-ounce unit was adopted in view of the greater relative costs, there had been considerable differences in the charges for posting to different European countries, varying (in 1928) from 2d. for Belgium to 8d. for Russia, and in each case the amount of the ordinary postage had to be added. In 1930 a single flat rate of 4d. for the first ounce and 3d. for subsequent ounces was introduced for all European countries. In 1934 the Post Office was able, by arrangement with Imperial Airways, to introduce the uniform charge of 3d. per half-ounce for all letters to the Near East, and a similar flat charge of 6d. for India, Malaya, East and South Africa, but the same degree of unification was not found possible in other cases.

However, these gradual reforms certainly made the posting of air mail letters a much simpler matter, and until the introduction of the all-up system the Post Office made considerable efforts to encourage the use of air mail. These efforts included the installation of special blue posting boxes, which had done good work both in simplifying the sorting procedure and in reminding the general public of the existence of useful postal air services.

Mr. Lumley showed a number of diagrams indicating the growth of air mail traffic during the first period of development. In one of these it was interesting to see how, between 1929 and 1936, the degree of acceleration increased, the postage rates fell, and the percentage of mail sent by air increased proportionately. Two exceptions to the trend were East Africa, in which, because of the special acceleration obtained, the air claimed 20 per cent. of the total amount of mail, and Australia, in which the effect of the considerable acceleration was still somewhat nullified by that of the comparatively high postal rate. The diagrams served to show that, in spite of the rapid increase in the number of air services between 1919 and 1935, the amount of mail attracted was a very small proportion of the total volume. The conclusion was obvious; that nothing short of a radical change of system would be effective in transferring any large additional quantities to the new means of transport.

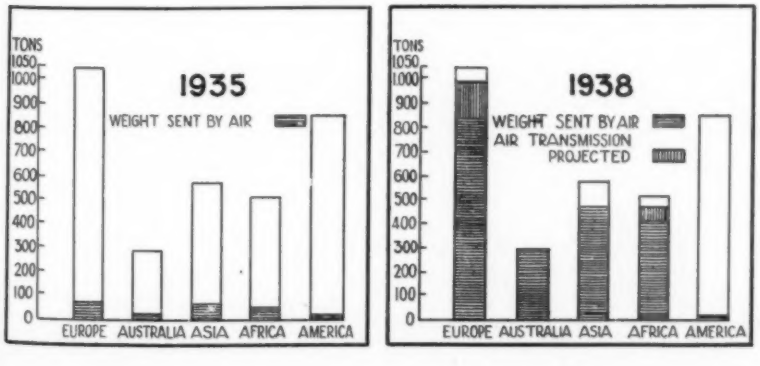
It was therefore decided that, instead of leaving the poster to decide how a letter should be sent, the Post Office should, if financial and other considerations permitted, arrange to send all letters by air. In 1936 the all-up system had begun to replace the older surcharge system and the second period of development started.



**Loading mail into the floats of *Mercury*, upper component of the Short Mayo Composite, before she left Southampton on her 2,400-mile non-stop flight to Alexandria on Tuesday of last week, carrying over a ton of Christmas postal load.**

### *Internal Experiments*

Curiously enough, the first practical experiments in all-up mail carriage were made in this country—a fact which is not generally remembered. As long ago as May, 1934, all mails were initially carried between the mainland of Scotland and the Orkneys by Highland Airways—Captain Fresson's concern, which is now merged into the Scottish Airways group. Shortly afterwards the Postmaster General agreed to consider the use of any regularly operated internal services which afforded useful acceleration at a reasonable cost. The services at present used were, in nearly every case, those in which the route crossed a reasonable stretch of water. Something like six hundred tons of letters were now being carried every year inside this country, but until night-flying became a normal procedure, air services, for mail-carrying purposes, could not be



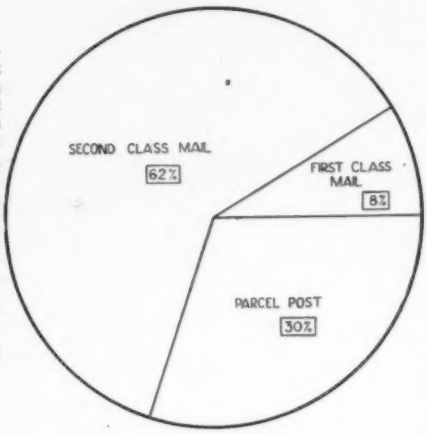

**A useful comparison between the amount of mail sent by air to different parts of the world before and after the development of the all-up scheme. The total areas shown indicate the volume of mail in each case which is susceptible to acceleration through air transport—the full amount involved being 3,200 tons per annum. In effect, arrangements have been made for more than two-thirds of the whole of the first-class mail to be carried by air. If mails for the American continent are, as they must be for the present, ignored, 90 per cent. of the mail is, or will shortly be, sent by air as a matter of course.**

expected to compete with existing surface transport.

The Empire air mail scheme provided for the carriage of all letters, letter packets and postcards at a flat rate of 1½d. per half-ounce in the case of letters, and one penny for postcards. The agreement with Imperial Airways was for fifteen years.

The first stage of the scheme was inaugurated in June, 1937, when mails were carried to East and South Africa; the second stage in February, 1938, with mails to India and Malaya; and the third and final stage in July, 1938, with mails to Australia.

In order to make the plan self-supporting so far as our own Post Office was concerned it would have been necessary to fix the rate at 2½d. per half-ounce, but it was considered fairer merely to reduce the weight allowance and keep the normal Imperial postage rate of 1½d., particularly since 70 per cent. of all letters posted for Empire destinations were within the lower weight-limit. The all-up scheme provided for three services a week to East Africa; two to South Africa; four to India; and three to Malaya and Australia—with, of course, the use of appropriate feeder lines. Eventually it was hoped that the service would be accelerated so that Karachi was reached in 2½ days, Durban in 4 days and Sydney in 7 days. The respective times by sea were 14, 14 and 32 days.




**The proportionate weight of mail in the different categories now being dispatched from this country. First-class mail includes letters and postcards, while second-class mail includes printed and commercial papers, samples and so forth.**

For the benefit of those who imagine that the weight of first-class mail which is carried by air forms a large proportion of the total carried, it is worth repeating Mr. Lumley's statement that this section comprises only 8 per cent. of the total.

More interesting and complicated were the arrangements for the development of European all-up mail services. Again in 1936 the Post Office decided that all letters and postcards addressed to a European country, and prepaid at the ordinary rate of postage (2½d. for the first ounce and 1½d. for each additional ounce), would be entitled to transmission by the fastest means of conveyance, whether aeroplane or otherwise. In certain cases, notably between London and Paris, the use of air services offered no particular advantage, but for the rest of Europe it was decided that the provision of two dispatches a day towards each important centre would be aimed at. The first dispatch would be by night service, for those letters posted in the ordinary way in the evening, and the second a day service for further letters posted up to midnight in London and at normal times in the provinces.

In March, 1936, the first all-up mail for a European destination was carried on the British Airways' service to Copenhagen and Stockholm. In July of the same year a corresponding night service was instituted in which British Airways operated in pool with the Danish D.D.L. and the Swedish A.B.A. In August last year arrangements were made for British Airways to share with the German D.L.H. the operation of night services between Croydon, Cologne, Hanover and Berlin—a route which had previously been covered for many years by D.L.H. six times a week. In September, 1937, mail for Switzerland and France began to be sent by services from Croydon.

### *The Future*

At present twenty-four European countries were served by the all-up system, the only exceptions being Malta, Gibraltar, Spain and Portugal, though Malta would be included in the near future when the new landplane route to India was being used. The decision of the European air companies to accept mails at a standard rate per tonne-kilometre, which was less than half of that for surcharges mail in the past, had materially facilitated the development of the system. At present some 850 tons per year of mail left this country by air for European destinations.

Dealing with the future, Mr. Lumley mentioned the projected British air service to West Africa, in which mail would be sent at flat rates, and also the projected services across the North Atlantic. On the latter it would be necessary at first for a special fee to be charged. When, eventually, a British air service was operated across the South Atlantic the Post Office hoped to be able to reduce the very high postage rates at present charged for transmission to American countries. About 90 per cent. of mail carried from this country was now flown by British services.

In conclusion, Mr. Lumley acknowledged the debt of the Post Office to two volunteer bodies—the Postmaster General's Advisory Council and the Post Office Publicity Committee.

# RECRUITING in the RIGHT WAY

A VISIT to the London Recruiting Depot of the Royal Air Force at Victory House, Kingsway, is quite an interesting experience. Group Capt. E. R. C. Nanson, C.B.E., D.S.C., A.F.C. (retd.), is the Inspector of Recruiting, and to meet him again was to recall pleasant memories of Schneider contest days at Calshot, when he commanded the station.

The waiting room is attractive, and the recruits must be very favourably impressed by their first experience of the Air Force.

A batch of prospective recruits was lined up in the passage waiting to be examined in turn. After the details of names, etc., have been recorded, the medical examination is carried out at the depot.

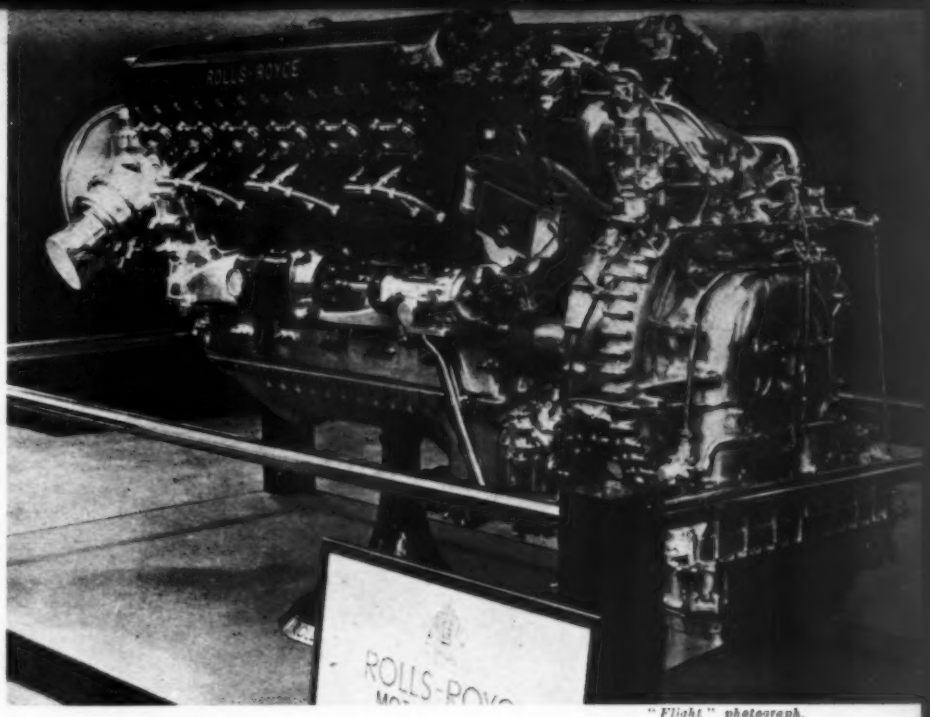
Attention was drawn to four new publications which have just been issued, and which will be distributed throughout the country, mainly to schools and other educational establishments. One quite handsome photographic album is entitled *Learn a Trade in the Royal Air Force*, and shows photographs of airmen engaged in most of the trades which are practised in the R.A.F. Against each trade is a table showing the method of enlistment into that trade, the period of instruction, the period of service, and the daily pay. Twenty-four trades are thus described, including airman pilot and air gunner, which are not "trades" in the Air Force meaning of the word. The other three new publications are pamphlets which will be distributed to applicants free. One, *Royal Air Force— A Life for Men*, gives the prospects which are open to a recruit who enlists as an aircraftman or an aircrafthand, while the others deal with aircraft apprentices and boy entrants. These recruiting depots deal chiefly with direct-entry aircraftmen and aircrafthands. The latter word implies an airman who has not been accepted into a recognised R.A.F. trade. Group Capt. Nanson remarked that about 80 per cent. of the enlisted aircrafthands are taught a trade after being accepted into the Service. It must be understood that this direct enlistment supplements and does not displace the entry into the Service of ex-apprentices from the Schools of Technical Training at Halton, Cranwell and Cosford. Apprentices enter these schools, and boy entrants apply for enlistment through educational authorities, though a recruiting depot will always give information to those interested. The candidates for boy entrant are interviewed at the Reception Depot at West Drayton.

The present requirements of the R.A.F. are 30,000 recruits a year, the recruiting year ending on March 31. In the first eight months of the present year over 20,000 recruits have been secured, which is two-thirds of the number wanted in two-thirds of the time. Not too bad!

The chief need at present is for more wireless operators. This trade calls for rather a higher standard of education than most other trades, and for that reason it is harder to fill its ranks. The new photographic album gives the following facts about this trade: Method of enlistment—as boys between the ages of 15½ and 17½ or as aircraftmen aged 17½ to 35; period of service—until the age of 27 for boys, six years for aircraftmen; daily pay—3s. 6d. to 5s. 6d.; instruction—twelve months' course for boys or six months' course for aircraftmen in operation of wireless sets on the ground and in the air. It sounds attractive. One should note the difference between the trade of wireless operator and that of wireless operator mechanic. Nearly all the latter are ex-apprentices from the Electrical and Wireless School at Cranwell, but sometimes a specially good wireless operator may be trained for the higher grade, when the pay is 3s. 9d. to 6s. per diem.

An hour at the London Recruiting Depot shows that so far as personnel goes the R.A.F. is expanding in a very satisfactory way, both in quantity and quality.

F. A. DE V. R.




"Flight" photograph.

The two-speed supercharged Rolls-Royce Merlin X—probably the most admired liquid-cooled unit in the whole show.

# SOME TRENDS IN ENGINE DESIGN

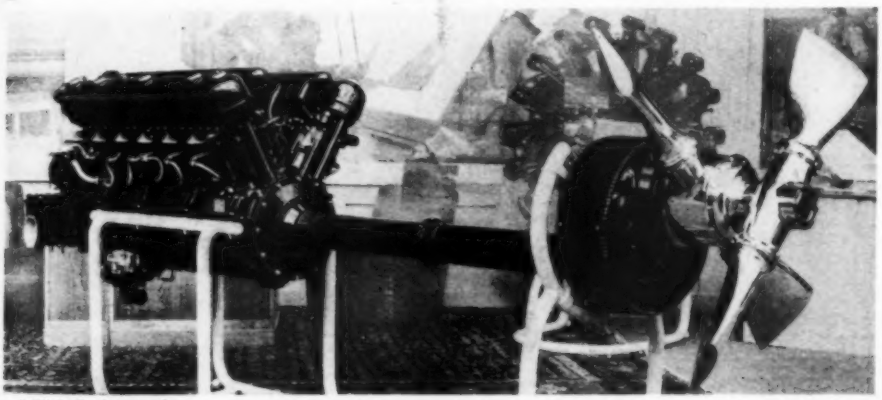
## *Important Advances in All Types of Units at the Paris Salon : Britain's Usual Show of Excellence : A 2,000 h.p. Hispano*

THE real value of "trends" which are often assumed to be indicated by exhibits in the Paris Salon is frequently questionable. Particularly is this true of the aero engines. So many initially promising prototype power plants appear in modified form year after year on the stands of their manufacturers but never in actual aircraft, and the number which achieve widespread adoption is very small even compared with the number of prototype aircraft which find their way into general use. Nevertheless, we can ill afford to ignore any new unit, however unorthodox it may seem in comparison with established types, for engine development still runs in very diverse channels and a seemingly fantastic novelty may have a definite effect on future design. By way of example, the Napier-Halford Dagger with its twenty-four tiny cylinders in H formation and its high operational speed would have occasioned a good deal of cynicism when it was shown for the first time (even with the name of Napier behind it) had it not been developed to an advanced stage of refinement and reliability and subjected to official test before being publicly announced.

This year, the only startling departure from conventional design among the bigger units is the 2,000 h.p. Hispano Suiza, though there are many units (notably British) which, although developed directly from types which have appeared before, are virtually new designs in that they open up fresh possibilities in aircraft development. The best examples this year are those engines equipped with two- or three-speed superchargers or developed for operation on 100-octane fuel.

Despite the ingenuity displayed in the development of air-cooled units from the little four-in-line to the massive two-row radials and other multi-bank types, the liquid-cooled camp is not only holding its own but making up much of the leeway it has lost in certain directions during post-war years.

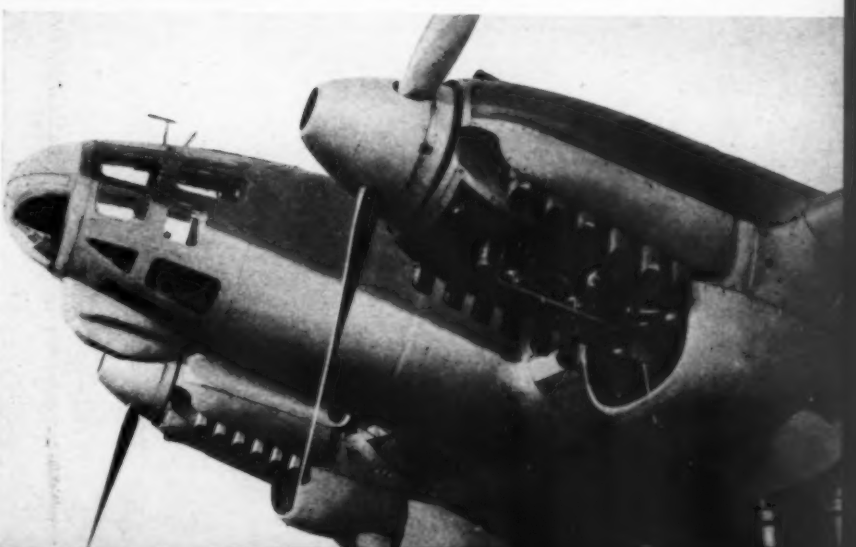
With the increase in size of commercial machines, the liquid-

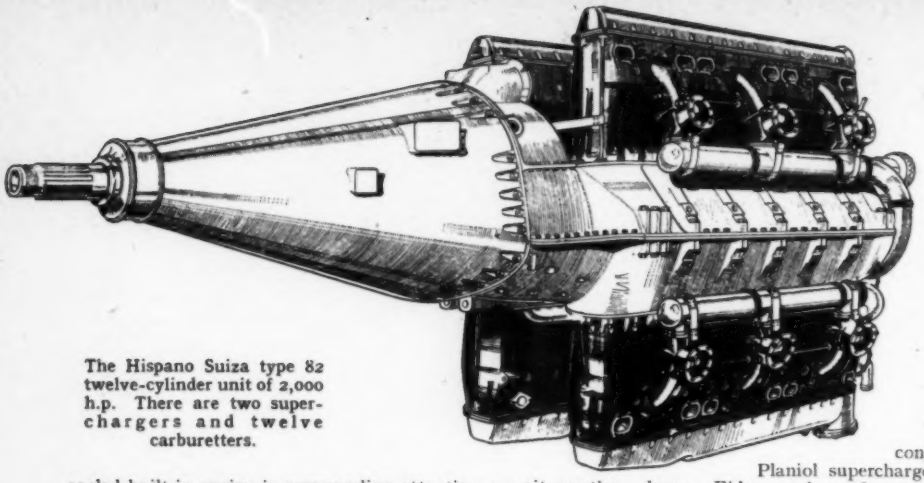


"Flight" photograph.

(Left) The latest version of the Lorraine Sterna with extension shaft and oppositely rotating airscrews. This combination has been fitted in the Koolhoven F.K.55 fighter.

(Below) The installation of two Daimler Benz D.B.600 inverted vees in a Heinkel bomber of the German Air Force. An engine of this type is exhibited at Paris.





**The Hispano Suiza type 82 twelve-cylinder unit of 2,000 h.p. There are two superchargers and twelve carburetters.**

cooled built-in engine is commanding attention, as witness the specifying of the 2,000 h.p. Allison Xs for the projected Seversky transatlantic seaplane and the development of the new Hispano for France's new commercial giants. The installation of four of these Hispanos is being suggested instead of fitting six lower-powered units. This would, of course, simplify maintenance problems.

The type is being developed in two forms—the types 82 and 90. The former has been studied for concentric opposite-revolving airscrews but otherwise its design is similar to the type 90. The twenty-four cylinders are arranged in four banks of six, there being two crankshafts, as in our Napiers. Cylinder banks are similar to those used for the well-established Series Y twelve-cylinder Hispano. The cylinder capacity is 72 litres, the compression ratio 7:1, the nominal power 2,000 h.p. at 2,400 r.p.m., and the dry weight 2,200lb.

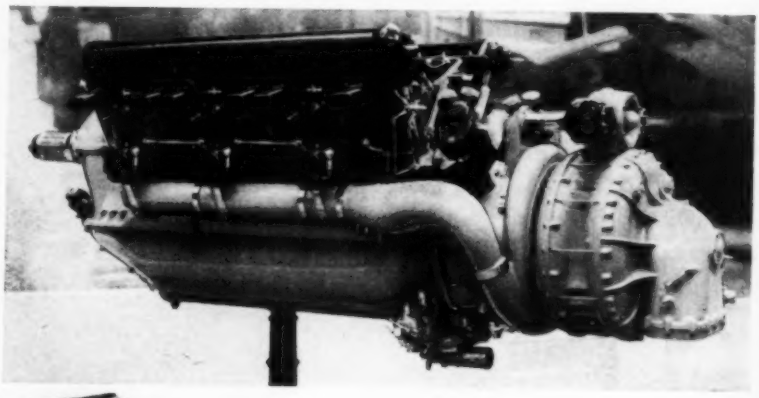
There are two centrifugal blowers, each serving a group of twelve cylinders. These have automatic mixture controls with a take-off over-ride; they run at ten times engine speed and give a boost equivalent to 880 mm. of mercury.

The crankshafts are generally similar to those used for the 12Y and are fitted with dynamic dampers on the Sarazin principle. There are four magnetos and, following usual Hispano-Suiza practice, three carburetters to each bank.

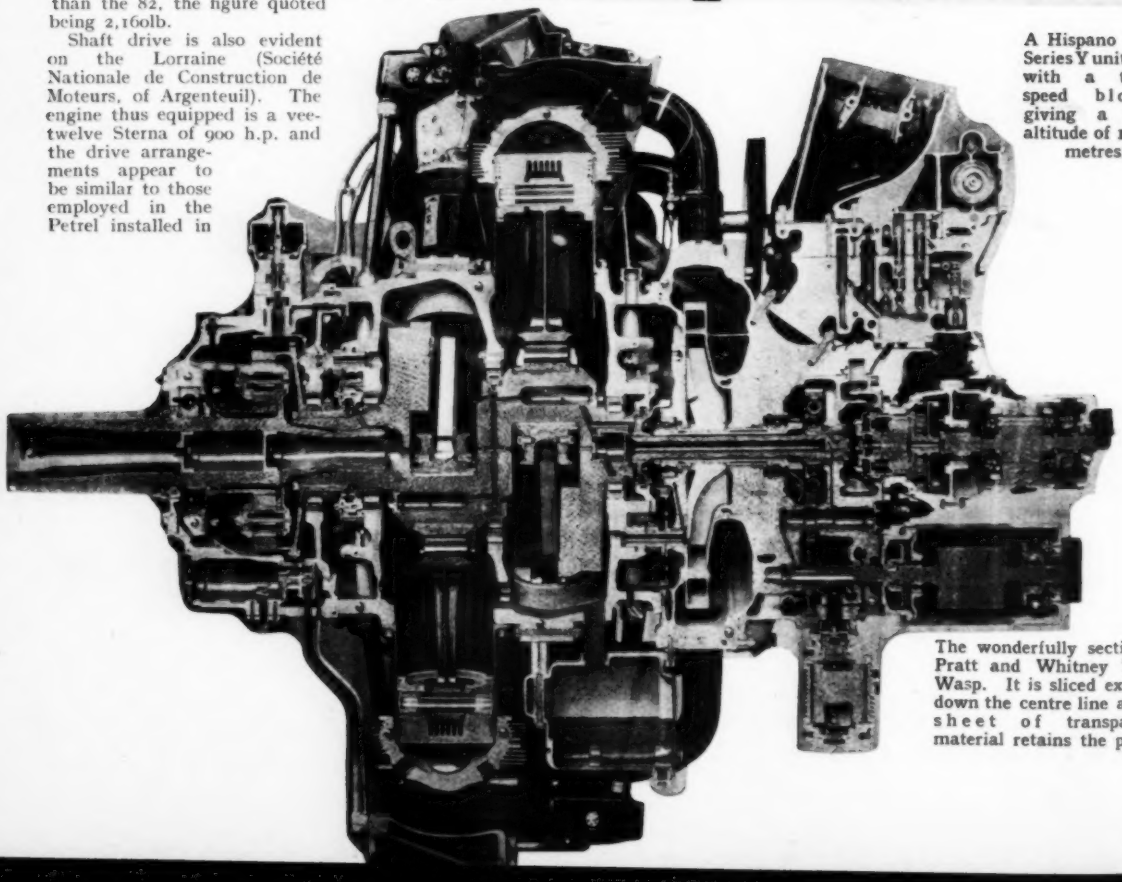
The type 90 engine weighs rather less than the 82, the figure quoted being 2,160lb.

Shaft drive is also evident on the Lorraine (Société Nationale de Construction de Moteurs, of Argenteuil). The engine thus equipped is a vee-twelve Sterna of 900 h.p. and the drive arrangements appear to be similar to those employed in the Petrel installed in the Koolhoven single-seater fighter two years ago. The present version of that machine—the F.K.55—is actually fitted with a Sterna. Other Sterna developments include left- or right-hand rotation; raised (désaxé) reduction gear, permitting the installation of a shell gun; two-speed supercharger giving 900 h.p. at 5,000ft. and 850 h.p. at 14,750ft.; and direct petrol injection in conjunction with the use of a Planiol supercharger. It would appear that the larger Eider engine of 1,300-odd h.p. has been discontinued.

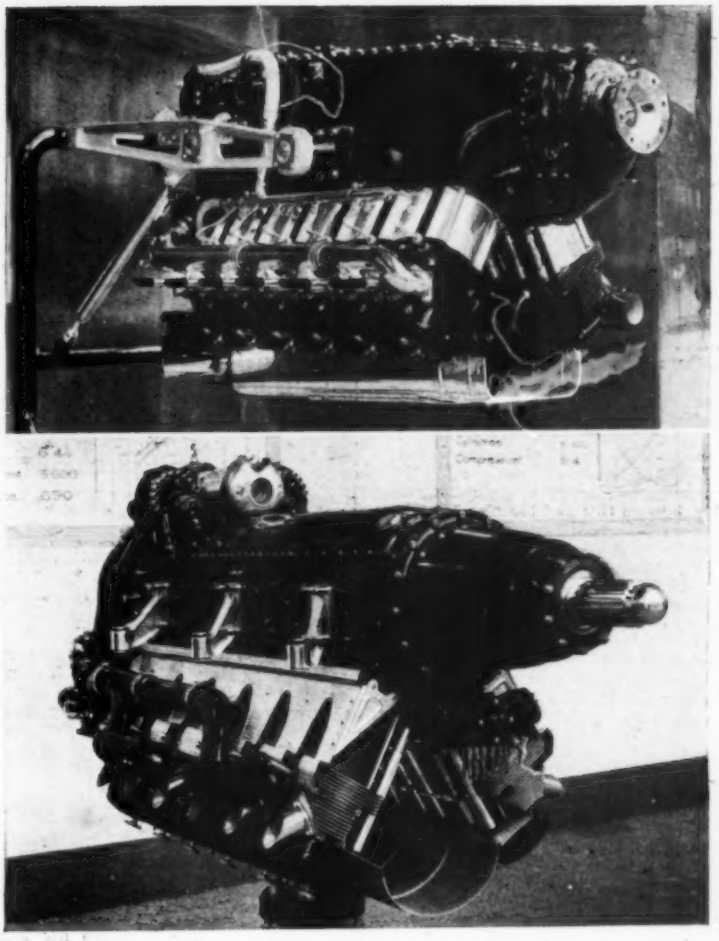
Despite the intensive development work by S.N.C.M. on liquid-cooled units, it seems that a good deal more will be needed before large-scale production can be embarked upon. On the other hand, the Rolls-Royce Merlins, represented this year by a fully supercharged model and the new Merlin X with two-speed supercharger, are already being produced in quantities. Apart from the two-speed blower there is added interest in the announcement of new ratings on 100-octane fuel both for take-off and at altitude.



**A Hispano Suiza Series Y unit fitted with a three-speed blower giving a rated altitude of 10,000 metres.**



**The wonderfully sectioned Pratt and Whitney Twin Wasp. It is sliced exactly down the centre line and a sheet of transparent material retains the parts.**



**A comparison of German and French practice in the construction of inverted air-cooled vee-twelves. At the top is the new Hirth and below is the Renault.**

Figures are being quoted on the Rolls-Royce stand for the Merlin R.M. 2M rated on 100 octane fuel. The normal output at 7,870ft. is 1,265 h.p. and the maximum at 9,500ft., 1,285 h.p. with 1,320 h.p. available for take-off. The fully supercharged Merlin II, III and IV give 1,015 h.p. for take-off on the same fuel. Even more impressive are the figures for the Merlin R.M. 2 S.M. with two-speed blower. The international rating at 7,870ft. is 1,265 h.p. and the maximum at 9,180ft. 1,285 h.p. Take-off output is 1,320 h.p. With the supercharger in top gear the output is 1,150 h.p. at 15,400ft., the maximum available for level flight at high altitudes being 1,160 h.p. at 16,730ft.

Of particular interest is the announcement of " potential " power which may be regarded as the theoretical full-throttle power of the supercharged engine at sea level. The maximum potential output of the Merlin II is 1,800 h.p., the potential specific power working out at 66.6 h.p. per litre, or 300 h.p. per sq. ft. of frontal area.

It is also revealed that the speed-change gear for the two-speed blower in the Merlin X is operated by oil pressure from the scavenge system and that the time to change gear under full-power conditions is of the order of one second.

Though there is no example of the new Peregrine engine on the Rolls-Royce stand, a large photograph of this promising new unit shows such features as its compactness and the layout of the downdraught carburetter.

The Hispano Suiza 12 Ybrs shown on one of the aircraft stands is fitted with a three-speed supercharger giving 920 h.p. at 32,800ft. This appears to be a special show piece and little or no data are available. Officially Hispano Suiza are showing a 12 Y engine of the latest series; despite its larger capacity, this engine compares unfavourably with the Merlin in output.

Another unit which, though it has a greater displacement than the Rolls-Royce, is hardly as powerful, is the Daimler Benz D.B. 600. This engine is quickly leaving its teething troubles behind and is installed in a large proportion of the machines in the German Air Force. The makers say that they adopted the inverted type to keep the upper part of the engine as narrow as possible so as not to interfere with the pilot's visibility in single-seaters. The advantage gained seems to be more theoretical than actual. An interesting feature on the fully supercharged model is a time switch which automatically cuts out the over-ride boost after five minutes. There is no evidence on the Daimler Benz petrol engine of direct injection or coil ignition. The carburetter is of the Daimler Benz pressure type and the magnetos of Bosch manufacture.

## *An Improved Daimler-Benz*

In their publicity matter the makers mention the speed records of the Messerschmitt and Heinkel fighters as having been set up with a D.B. 600 engine, though actually the Heinkel which reached 634 km./hr. had a D.B. 601, details of which are not yet available.

Junkers are presenting a Jumo 211 petrol engine. Direct injection is available with this unit.

In spite of the advances made on the Continent during the past two years with air-cooled units, Great Britain, with the De Havilland and Cirrus in-lines and the Bristol and Armstrong Siddeley radials, makes a challenging show.

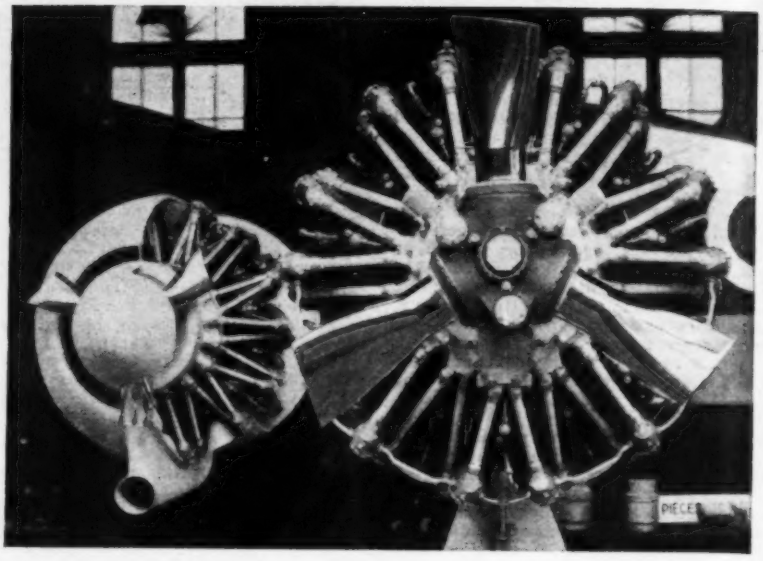
Bristols have put on a magnificent exhibition comprising the two-speed supercharged Pegasus XVIII, which gives 885 h.p. (max.) at 15,500ft.; the small-diameter Mercury VIII, which delivers 920 h.p. for take-off with 100 octane fuel; the Perseus XII sleeve-valve unit (905 h.p. max. at 6,500ft.); Hercules II (1,375 h.p. max. at 4,000ft.); Aquila (600 h.p. for take-off); and the magnificent new 14-cylinder Taurus sleeve-valve engine, which is 46½in. in diameter, runs at speeds between 2,800 and 3,000 r.p.m., and has a maximum output of over 1,000 h.p. The Hercules is shown with a Rotol airscrew, cowling (with leading edge exhaust collector ring and a single large outlet), intake for the downdraught carburetter, quickly detachable mounting and external oil-cooler. A Bronzavia carburetter may be specified.

One of the most attractive of the smaller engines in the show is the new Siddeley Cheetah XI, a moderately supercharged unit with a bore of 133.3 mm. and a stroke of 137 mm., giving a capacity of 12.42 litres. An innovation is the reduction gearing; vibration is avoided by a flexible hub mounting for the airscrew. The cylinders and valve gear are entirely new, the valves being splayed out quite sharply. A helmeted cowling about 41 inches in diameter is to be standardised. Take-off power is about 460 h.p. at 2,825 r.p.m.; international rating 415 h.p. at 2,650 r.p.m., at 7,500ft.; and maximum power 435 at 8,750ft.

De Havillands, with their Gipsy Twelve, are showing some of the Continental manufacturers what a large-geared and supercharged air-cooled inverted engine should be like. This unit, apart from the Walter Sagitta as installed in the Fokker fighter, seems so far to be the only one of type and size likely to meet with any great success.

There is a fair selection of lower-powered air-cooled vee-twelves, including the new Argus A.S. 410-1 unit described in *Flight* last week; the new Hirth, which is a competitor of the Argus; the Renault, which has been slightly improved since last year; the Salmson *moteur canon*; and the Walter Sagitta already mentioned.

It was fortunate that details of the unique 24-cylinder Napier Dagger VIII were released just before the show. This unit is rated at 925 h.p. at 9,000ft. and delivers 1,000 h.p. at 8,750ft. The close finning of the cylinders is noticeable in comparison with earlier models, and accessories include an S.U. up-draught carburetter, Amal flame trap, Napier gear-type fuel pump, De Havilland constant-speed airscrew control unit and Rotax hand or electric starter. The net dry weight of the engine is 1,390 lb. and the fuel consumption under maximum cruising conditions at sea level is 66½ gallons an hour.



**In the foreground is the compact Gnome-Rhône 14M with the larger 14N, complete with sectioned cowling, behind.**

The French two-row radials are being developed along the same lines as last year (i.e., small diameter and high speed), excepting some of the larger types, like the Renault. The Gnome-Rhône stand is devoted to engines of the 14N and 14M series, there being no evidence of the big eighteen-cylinder unit, which, so far as is known, has not yet been in the air. The 14M is one of the most attractive-looking engines in the show and is being installed in a proportion of the new Potez 63 fighter bombers being delivered to the French Air Force. The larger 14N is shown with its cowling, a remarkable feature being the small diameter of the air inlet. The drag must approach "liquid-cooled" figures, and it would be interesting to get comparative data on this and the new Mercier cowling for radial engines. Hispanos are showing the 14 A.B. small-diameter two-row radial, which is in the same class as the small Gnome-Rhône. Welcome newcomers are the Pratt and Whitney Twin Wasp Junior and the Twin Wasp, the latter being cut exactly in half along the longitudinal centre line, showing the close tolerances and fine workmanship demanded in the modern aero engine. The unit is of the latest series C type and gives 1,200 h.p for take-off. The Wasp Junior is a 750 h.p. model and is similar to the power plant of the Vought dive bomber.

### *The Cyclone*

The Wright exhibit is a Cyclone G.102-A. It may be explained that the A series runs at rather higher revs than other Cyclone models and uses fuel of 90-octane number instead of 100. The output is 913 h.p. The Chandler-Groves non-icing downdraught carburetter is one of the more interesting features.

Instructive comparisons with the Cyclone are afforded by the Bramo Fafnir and B.M.W. 132 radials among the German exhibits. Both these units are already well known.

Among the miscellaneous radials of various sizes are the Lycoming R-680-D.5 of 380 h.p., the Lorraine Algol 120 of 600 h.p., which is available with solid fuel injection, the 70 h.p. Potez three-cylinder unit, and the various Salmsons, including a new five-cylinder unit.

The little Mawen rotaries are attracting a good deal of attention. The prototype of the 75 h.p. unit has done 350 hours of testing. The nine-cylinder 130 h.p. model has 550 hours to its credit and the five-cylinder 20 h.p. unit over 600 hours. Figures for the 7 B-1 unit are 75 h.p. at 3,313 r.p.m.; maximum r.p.m., 3,500; capacity, 2.16 litres; compression ratio, 6.8:1; weight, 80.5 kilogrammes.

Flat engines range from the evergreen Potez, complete with a cowling of comparatively conventional shape, to such types as the 70 h.p. flat four Minié and the 50 h.p. Lycoming.

There is the usual array of attractive four and six in-lines with De Havilland and Cirrus well to the fore. The Bloch concern have weighed in with a four and a six which are distinctive chiefly in the grouping of the cylinders.

There is little evidence of Diesel progress apart from the experimental 1,500/2,000 h.p. 16-cylinder unit shown by the French Air Ministry, though examples of the Daimler Benz airship engine, the Coatalen vee-twelve and the Clerget radial may be studied.

## C.A.G. IN SWEDEN

IT seems that the recent crisis has given Sweden something to think about in the matter of air defence readiness, and one result is the start of a form of C.A.G. scheme which is likely to be based on the English model. A special committee has been preparing the details which, by now, should have been published.

In the meantime a number of private persons have subscribed to what is called the Aviation God-Fathership Fund, the proceeds of which are to be used in support of civil flying training. Two sponsors have already subscribed the equivalent of approximately £5,000, and this sum will, according to the calculated expenses in Sweden, provide training for 60 pilots. A sum equal to half this has also been presented by a Swedish industrial magnate to the Royal Swedish Aero Club, chiefly for starting a volunteer reserve system.

In this connection it is interesting to learn that the Swedish shipbuilding firm, Aktiebolaget Götaverken, of Gothenburg, who decided some time ago to go in for aircraft construction, has now turned out its first product. This is virtually a Swedish version of the American Rearwin Sportster, and is known provisionally as the G.V38. The power plant of the prototype is a 90 h.p. Le Blond, with which it has a maximum speed of 118 m.p.h., a cruising speed of 105 m.p.h., and a landing speed of 38 m.p.h. A suitable power unit of European make is being sought with a view to starting quantity production. Its layout is conventionally American with an enclosed tandem two-seater cabin and a strut-braced high wing. The fuselage is of welded steel, and the wings are of wood.

## *Forthcoming Events*

**DECEMBER.**

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| **Thurs., 8th.** | **R.Ae.S. Students' Section: Joint Lecture with I.A.E. Students' Section: "Carburation and Induction in Aircraft Engines," by K. C. Hunt; 12, Hobart Place, London, S.W.1.** |
| **Thurs., 8th.** | **R.Ae.S. Portsmouth Branch Lecture: "Retractable Undercarriages," by G. H. Dowty.** |
| **Fri., 9th.** | **Northampton Engineering College Past Students' Association: Annual Dinner, Café Royal, London, 7.30 for 8 p.m.** |
| **Tues., 13th.** | **Colleges of Automobile and Aeronautical Engineering: Annual Dinner and Dance, Grosvenor House, London, 7 for 7.30 p.m.** |
| **Thurs., 15th.** | **R.Ae.S. Yeovil Branch Lecture: "The Paris Aero Show," by W. E. W. Petter.** |
| **Thurs., 15th.** | **R.Ae.S. Coventry Branch: "Aero Engine Carburation," by E. W. Knott, M.I.A.E., M.S.A.E.** |
| **Thurs., 15th.** | **R.Ae.S. Portsmouth Branch Lecture: "Influence of Design on Engine Production," by L. H. Pomeroy, M.I.Mech.E., M.I.A.E.** |
| **Thurs., 15th.** | **R.Ae.S. Lecture*: "Some Results from the Deutsche Forschungsanstalt für Segelflug Smoke Tunnel," by Herr A. Lippisch, A.F.R.Ae.S.** |
| **Thurs., 15th.** | **D.H. Aeronautical Technical School: Reunion Dinner, London Aeroplane Club, 8 p.m.** |
| **Tues., 20th.** | **R.Ae.S. Isle of Wight Branch: Debate.** |
| **Tues., 20th.** | **R.Ae.S. Students' Section Lecture: "The Air Mail Scheme," by Gibson Pattison, F.S.S.** |

**FEBRUARY, 1939.**

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|---|---|
| **Wed.—Fri., 1st—3rd.** | **Aerodrome Owners' Association: Airports Conference and Exhibition.** |

* This lecture takes place at 6.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1.

# THE STEEL DINNER

## *Sheffield A.I.D. Approved Inspectors' Ninth "Annual"*

MANY well-known figures in Great Britain's steel industry were present last week at the annual dinner of Sheffield's A.I.D. Approved Inspectors. In recent years—the dinner was the ninth of the series—this function has grown both in size and importance. This year over 350 inspectors and manufacturers sat down to dine at the Royal Victoria Hotel, Sheffield. In the absence of Mr. L. Chapman, owing to a bereavement, Mr. F. Wardrobe, of Wilson Jessop and Sons, Ltd., was chairman. In proposing the toast of "The A.I.D.," he spoke of the success of the system of approved inspection, the extension of which in recent times could never have been foreseen or considered possible by those who were keen on its adoption fourteen years ago. He emphasised the friendly spirit that existed between the A.I.D. and the manufacturers by pointing out that the machinery for dealing with difficulties between the two parties had been resorted to only twice during the past year—and in neither case were the matters too difficult to settle.

The rapid extensions of aircraft production and the demands on the suppliers of every class of material would have created chaos had it not been for the responsibility placed on the manufacturer under the scheme of inspection. Mr. Wardrobe stressed the delay which would inevitably have resulted had they had to await the convenience of visiting inspectors. The country was saved large sums of money by the manufacturers' approved internal inspection organisation, the chief benefit of which was that they could get on with the job. The other Services were interested in the system.

He then went on to disclose the fact that the Sheffield manufacturers pooled their research work and that information which years ago was considered a closely guarded secret of any one firm was now exchanged.

In closing, Mr. Wardrobe obviously could not refrain from having a quiet dig at officialdom over the question of black bar rejected on the score of some slight surface flaw. This was a point which Capt. S. Gordon Young, M.B.E., was quick to dismiss, in his reply, by stressing that rather than hold up a complete works through the delivery of faulty material it was better to inspect it closely at the source. Capt. Young said that inspection was often accused of slowing up production, but in actual fact the opposite was the case. He also mentioned that it was more than probable that the system of approved inspectors would be employed by the other Services, to judge by their interest in the present system.

Mr. C. Wilkinson, of the Sheffield branch of the A.I.D., proposed the toast of "The Approved Inspectors," and in his best and breeziest manner went off at a tangent to the subject of Sheffield's aerodrome or, rather, the lack of one. Apart from the fact that C.A.G. pupils on duty bent had to travel many weary miles to the nearest aerodrome (which lies outside Worksop), an aerodrome would be a big factor in the defence of Sheffield, which even more than London should be efficiently protected from aerial attack.

Mr. Wilkinson said it was the custom to mention the number of release notes issued during the year, but as no one in his office could count over a million (even if they had the time), and the fact that Birmingham—the centre of the split-pin industry—might enter into a spirit of rivalry and issue a release note for every pin, he thought it wisest not to give figures.

Mr. Geoffrey Flather replied on behalf of the approved inspectors, and in a brief and suitably light vein—the speeches had become noticeably lighter as the evening progressed—suggested that the approved inspectors should wear badges, in opposition to the A.I.D.

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# ORATORY AT EASTBOURNE

OVER two hundred members and guests of the Eastbourne Flying Club dined at the Grand Hotel, Eastbourne, last Friday evening. The occasion was the Club's annual dinner and dance and, incidentally, it marked the retirement of the indefatigable secretary, Capt. E. I. Short, whose efforts had been largely responsible for the foundation of the Club and for its steady progress.

It was a jolly evening, even if the number of speeches was a little overwhelming—there were ten in all, not counting the magnificent efforts of the toastmaster, whose precise wording of each toast almost amounted to speeches in themselves. The speakers, however, did respond to the request of the chairman, Lt. Col. Roland Gwynne, D.S.O., to keep their speeches as brief as possible.

His Worship the Mayor of Eastbourne, Alderman A. E. Rush, J.P., set the ball rolling by proposing the toast of "The Club" and pointed out that Eastbourne's Club was an example of what a small concern can do. It started, he said, in 1932 with an old wooden hut and an old aeroplane. It now has a fine club-house and hangar and 225 members.

Mr. C. A. Wilson, in his reply, suggested that the borough treasurer should dip even deeper into the borough purse in the cause of the Club. Both the speeches by Mr. C. S. Taylor, M.P., and Marshal of the Royal Air Force Sir John Maitland Salmond, G.C.B., were just what the assembled company wanted; the speakers were bright, humorous and to the point when they respectively proposed and responded to the toast of "Civil Aviation."

Lt. Col. Roland Gwynne spoke highly of Capt. Short, the retiring secretary, who, he said, had done more to put Eastbourne on the map than had any other individual. He described him as a remarkable man whose persuasive powers had enabled him to overcome the fiercest opposition and in the end to get his way. Capt. Short himself replied in almost aggressive tones (or was it the microphone?). He said that Eastbourne had not originally realised the importance of aviation, but hoped that it did now. He pleaded that everything should be done to make the British Empire all-powerful in the air. Every man must have facilities for flying training, and he hoped that the borough would support the Air Defence Cadet Corps. He mentioned that he had persuaded the borough to grant the Club an annual subsidy for seven years and was only sorry that he had not asked for more.

Following the example of previous speakers, the toast of "Our Guests" was quickly dismissed by Mr. Henry Blower and Mr. J. G. Gibson, Director of Home Civil Aviation. Finally, the chairman was toasted by Capt. Love, and the party adjourned forthwith to the ballroom.

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# HERTS AND ESSEX CELEBRATE

AS in past years, the annual dinner and dance of the Herts and Essex Aero Club, held last Thursday, at Park Lane Hotel, London, was a model of what such affairs should be. That is to say, there were neither too few nor too many people present; the actual dinner—which, after all, is the point round which such functions revolve (though perhaps that is an unfortunate choice of phrase)—was above all criticism; the dancing afterwards was interlarded with some good cabaret turns; and the club officials, notably Mr. Sidney A. Perrin and Mr. F. E. Darlow, were tireless in making every guest feel one of the family.

This year, too, speeches were kept to the bare minimum. The speakers were Mr. D. A. Cracknell (an instructor), Mr. Roger Frogley (chairman of the Club), and Mr. Harold Perrin (secretary of the Royal Aero Club), who presented the prizes. Chief points of interest which emerged were the fact that Broxbourne now boasts 24 aeroplanes, 13 instructors and a ground staff of 50, while the offshoot, the new Reserve School and Club at Grimsby, is going ahead strongly, and recently flew 54 hours in one November day with ten aircraft. C.A.G. sections at both aerodromes are helping to swell flying hours.

Mr. Tom E. Davies, J.P., was the hon. toastmaster, and nobody with any claim to recognition escaped his stentorian invitations to "Take wine with the chairman."

And so, after the prize presentation, to face bravely the hazards of the Lambeth Walk and the Palais Glide (than which no dance was more inaptly named). Principal prizes, by the way, went to:—

**Margaret Blackshaw Cup** (cross-country).—S. H. Parker.
**Janet, Lady Brickwood Cup** (forced landing).—M. O'Donovan.
**Observers' Competition.**—Pilot R. C. Sankey, Observer L. S. Kench.
**Yager Cup** (cross-country, under the hood).—R. C. Sankey.
**Mollison Cup** (aerobatics).—Archer Edwards.
**Woodside Cup** (club championship).—Archer Edwards. Runner-up, S. H. Parker.

# POSTSCRIPT T

*The Salon from the Civilian Angle Usef*
*Lightweights and Idme*

LIKE the majority of those visitors not directly concerned with the somewhat tiring and boring business of looking after stands, I visited the Paris Aero Exhibition for the purpose of obtaining some good ideas—mainly of civil and instrumental interest. To be quite frank, there was not very much of civil interest, though anyone who took the trouble to examine all the stands in the gallery with real care over a considerable length of time found an enormous number of little devices which were both new and important. After all, full-sized aeroplanes are largely made up of odds and bits, and if the French aircraft industry can produce them, then there cannot be very much wrong with it.

When I say that there was little of civil interest I am not harping on the criticism that three-quarters of the exhibits were mock-ups or models. Provided that one is reasonably certain that a particular mock-up will eventually be a real aeroplane, it is much more interesting in examination than the real thing—simply because it is a year or two years before its time, or should be. After all, who could possibly want to see one of Air France's Bloch 220 transports when it can be seen every day at Croydon, Le Bourget and elsewhere?

We want to see the transport (or military) machine of tomorrow, and if this machine is not actually built, then we want to get an idea of what it will look like and see how it will be arranged inside. Even if the big transatlantic S.E.200 flying-boat, for instance, had actually been completed, the cost of getting it into the Salon would have been almost equal to that of a small-scale war, and there would have been little room for anyone else's exhibit.

But I am not pretending that there may not have been just one or two queer wood and papier maché devices which will, in real form, probably never take the air at all. That is the way of Paris Aero Shows. It is better to be optimistic than to be pessimistic—and merely show a row of 1934 transports or bombers.

Of genuine commercial machines there were practically none, and we ourselves can hardly complain, since our sole offer consisted merely of a model of a projected landplane—the Fairey long-range monoplane which has now been ordered by the Air Ministry. This type should be in full production in 1940, and the wind-tunnel tests on the model are stated to be complete.

Except for the Fokker D.23 fighter, here, too, was the only sign in the Show of the pseudo-modern tricycle idea. Incidentally, I think the term tricycle, when applied to this type of undercarriage, has done and will do the idea more harm than anything else. It should really be called a "level-landing" undercarriage, particularly since there is no reason to suppose that in ten years time any such arrangement will necessarily involve the use of only three wheels. The whole object of the device is fully explained in the expression "level landing"—all undercarriages are long-wheelbase tricycles.

Potez—now part of the Nord group—showed in the 662 the one really full-scale transport aeroplane. This is an exceptionally fast twelve-passenger all-metal transport development from the 661. Nearby was the 160 Potez-CAMS boat which, were it not for its six engines, might be desired by any enthusiastic seaplane amateur. This machine is the test-model for the 161 transatlantic boat. Although the half-dozen tiny Ratier airscrews looked true to scale, they are not, of course, actually of the variable-pitch type, but were probably adjustable on the ground.

## *Modern Testing*

This flying model formed a useful indication of one of the most important trends in modern test work. When prototypes are so very large and can be considered not so much as experimental but merely as the first off the production line, it is entirely essential that no vital changes should need to be made, and the use of a flying scale-model should permit such changes to be made in good time and at comparatively small cost. There is no reason, either, why the models should actually be scaled-down versions of the projected machine, so long as the essential items in the way of control surfaces, wing sections, and c.g. positions are identical. Before Shorts built their first Empire boat they used the

**The Lorenz ultra-short-wave blind approach receiving equipment in its latest form, with the visual indicator on the right.**

# TO PARIS

*Useful Make-believe : Transport Machines, Aldments Discussed—*

—By H. A. TAYLOR

Scion Senior for such preliminary test work, and this machine is still a useful type. The same company is now carrying out similar model work in the course of the development of another big machine.

In its full-scale form the Potez-CAMS is due to be fitted with six 860 h.p. Hispanos, but it may finally have four engines of rather greater power—such as 1,500 h.p. Gnome-Rhônes. The big S.E.200, too, is designed for six 1,500 h.p. Gnome-Rhônes, but it may have four of the new 2,000 h.p. Hispanos.

### *American Developments*

While on the subject of flying-boats, it should be added, there were details on the Fokker-Consolidated stand of a civil version of the well-known PBY boat which has been ordered in large quantities by the United States Navy. On the same stand there was some information about what is known as a Douglas Super Cargo, which is similar in layout to the D.C.3 supplied to the United States Army Air Corps for transport work. De Havillands' contribution to new demands in transport types was in the exhibition of scale models of the D.H.91 and the D.H.95, which is nearly ready to fly.

The transatlantic Farman landplane was hardly modern enough in conception to be of great interest, though one cannot afford to be superior about such things, particularly since the eight-year-old Latécoère boat is still showing a capacity to do useful long-range work.

The military types at this Show were adequately described, criticised, and compared in last weeks issue, and, in any case, they are, to my mind, expensive and uneconomic contributions to the development of flying. They make one doubt the ultimate wisdom of the Wright brothers in inventing the flying machine. Of the skill of the designers I have no doubt at all, but when unlimited power is available it should not often be difficult to produce an aeroplane which is extremely fast (though bristling with guns) when carrying only one occupant.

There was, however, a good deal for the student of design in the Fokker D.23. The idea behind this tandem-engined fighter seems to be partly to provide the pilot with a better forward view, and partly to reduce the evil effects of torque reaction. Engines are becoming so powerful and consequently so large that the pilot of a 1,000 h.p. fighter cannot possibly see very much in front of him, whereas if this power unit is split up into two he can be seated much farther forward.

One might suggest that somebody could build a machine on these lines, with a couple of Merlins, to attack the landplane speed record. Fortunately, nobody would ask me to fly it, though the tricycle should remove some of the more unpleasant possibilities. One other good thing in the Fokker from the military point of view is that the pilot should be well protected from the effects of gun-fire. Not only has he an engine behind him, but his little compartment is surrounded by a certain amount of armour plating. Certainly, if I were a fighter pilot I should be able to concentrate much more happily on the work in hand if I felt that I was being given some kind of protection.

Undoubtedly, the most impressing group display was that of Poland, though, again, the lack of any sign of civil interest on the stand makes one doubt whether the human animal will survive another decade. The only P.Z.L. machine which looked wrong to me was the Wyzel—a twin engined trainer which had no dihedral, no span to speak of, and the general appearance of a machine which would turn and bite at the slightest provocation. That, perhaps, is what is wanted in a trainer. In other words, the pilot who can fly the Wyzel can fly anything. The slotted flaps, which apparently extended outwards beneath the ailerons, were interesting. Nobody wants the purely drag effects of an aileron.

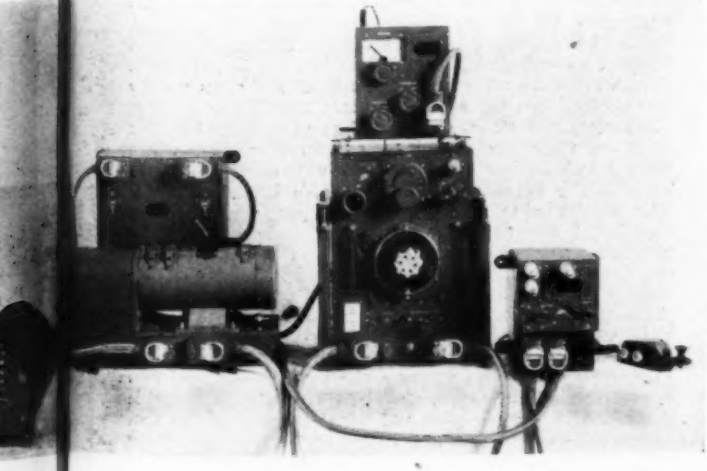
If the larger commercial types were somewhat disappointing, the *avions légers* were depressing. Looking up the word *léger* in the dictionary, I found it to mean "light, faint, or fickle." Those words seem to apply to most of the efforts of the French light aircraft manufacturers. Apart from the Miles Monarch, the Tipsy, and the Aeronca Chief, the only two light aeroplanes in the Show which looked really workmanlike were those on the Czech stand—the Benes-Mraz Superbibi, a cabin two-seater with a 95 h.p. Mikron engine, and the Zlin XII trainer, fitted, in this case, with a flat-four Persy engine. The latter was particularly interesting because there is a very good chance that it will be sold in this country in the near future. It is a low-wing, lightly loaded, tandem two-seater with a good reputation, and if examples are sold over here they will be fitted with a 60 h.p. Mikron, so that nobody can complain of lack of power.

### *A New C.S. Airscrew*

The Monarch was rather unfortunately placed, and quite a number of people may have failed to see that it was fitted with one of the new De Lavaud automatic constant-speed airscrews. This airscrew, in fact, did not arrive until the Saturday after the opening, and was not actually in place on the Monarch until Sunday. The stand carried various parts of the De Lavaud airscrew, as well as an example of the new wooden-bladed type, which, it is hoped, can be produced at a weight as low as 30 lb. The experimental model apparently weighs about 40 lb.

The cabin Tipsy, which was shown on the nearby stand, is not at present on the English market, but as soon as the manufacturers have gone ahead with the production of the ordinary trainer models at Hanworth and Slough they will presumably make a few of this type for private-owner use. The open type on the stand was actually that originally intended for open-air demonstration at Le Bourget, but it transpired that there was room on the stand, and the weather during the first day or two of the Show, at least, would not have permitted any but ground demonstrations. Aviation Equipment and Export showed the Aeronca Chief, which was a good example of what has become the standard light aeroplane layout in America. All three of the more important manufacturers of such types have settled down now to the high-wing, side-by-side, two-seater cabin layout with an engine of about 50 h.p.

Of the French light aircraft exhibits, one had to take special notice of the Mignet H.M.210, a *Pou* type which has survived the storm. Personally, I still believe in



**The lightweight two-way radio equipment used by Air Bleu on their postal Caudron Simouns. It is made by Bronzavia and is said to weigh, with generator, only 60 lb.**

the *Pou* principle, though it is likely to be some time before the general public recovers from the effect of the unfortunate accidents which occurred to amateur-built examples in this country.

The H.M.210 is very unlike these and was one of the most workmanlike little machines in the Show. It is a side-by-side cabin two-seater with the familiar single-control layout—in this case split into dual from a central forked column. Lateral movement operates the rudder, and the fore and aft movement, as before, tilts the main plane. Additionally, however, there is now a full-span elevator for the rear wing, and this comes into use only at the extremes of the fore and aft movement of the stick. M. Mignet himself is still as optimistic as ever, and explained this and another of its type had made 2,500 flights. One or two examples even of the old single-seater type are apparently still flying in France. We may yet see more of the *Pou* in this country.

If somebody asked me if there was any particularly good feature about any of the French light aeroplanes I should say that it was the way in which, on the majority of the machines, the doors were arranged to open. On the H.M.210 and on several other types the doors are hinged at the top so that there is any amount of entry space. Such an arrangement, too, should permit an aerobatic certificate to be obtained in the case of any machines which are otherwise suitable. At present, in this country, an aerobatic certificate is only provided in the case of cabin machines in which the door on each side is instantaneously removable. The point of this, without a similar demand that a parachute be carried, has always escaped me.

In a small way the old Kellner-Béchereau bi-monoplane" still seems to offer possibilities of development. This has its wing in two longitudinal sections, that at the rear providing slot effect, flap effect, or aileron control according to its angle in relation to that at the front. Here is one way in which the effect of an infinitely variable wing section might be provided, and somebody over here might consider it worth his while to carry on with the experiments.

The appearance of the pretty semi-mock-up Lignel Mistral racer set me off on a special train of thought. It might be said to follow the familiar Mew Gull formula—and the Mew Gull, as a racer, is the product of what can only be called the unsubsidised state of racing competition in this country. The sort of sportsman pilot who enters for races cannot usually afford a machine with an engine

Franco-British interlude I: M. Lebrun, the President, accompanied by M. Guy la Chambre, the Air Minister, inspects the Rolls-Royce Merlin. The imposing back view will be recognised as that of Mr. Golovine, R.-R. Continental representative, while in uniform is Group Capt. D. Colyer, D.F.C., our Air Attaché in Paris.

Looking down on the Bronzavia tail drift-sight. The object is followed by moving the control on the right, and the speed of the machine may be obtained by using the special stop-watch beside it; this measures the time of angular displacement, and the resultant figure, with the machine's height, gives the speed.

powered with much more than 200 h.p., and all the efforts have so far been expended in getting the utmost out of this power. If, however, prizes of a reasonable magnitude were put up for, say, the King's Cup race, there might be a chance that various people would find it worth their while to have special racing weapons built for them.

One has only to look at the entries for the National Air Races in Cleveland, America, to discover what handsome prize money can do. Admittedly, the majority of the entries are freak machines following the same old low-power, high-performance formula, but this year's big race was won by a real machine with a real engine at an average speed of about 280 m.p.h.—which is pretty good going over a course so small that all the fastest machines are in an almost perpetual turn. Presumably, the Pesco Special (or Turner-Laird) has a level speed of very well over 300 m.p.h. But that is by the way.

Just one word about engines. I wonder how many visitors noticed the Lorraine Algol radial with a direct injection system. Actually, "direct injection" is a misnomer, as the fuel is injected into the induction system, which is air-fed by a blower. Apparently, this particular variation of the Algol has done quite a lot of flying. The advantages of direct injection for aerobatic and military work are obvious, and such a system permits much greater latitude in valve timing than is possible with a normal carburetter. Presumably, one of the difficulties is to design the pump and the injectors to give good economy throughout a normal engine life. The idea of cutting off the fuel supply rather than throttling the whole inlet certainly makes one think of nice cool cylinders and a longer mechanical life.

## *Bits and Pieces*

For those who had the time to browse amongst the stands in the gallery, there was far more of interest up there than a casual look round might suggest. On the whole, too this country was better represented among what are casually known as accessories than with aircraft as such.

For sheer range of interest the Bronzavia stand probably took the prize, and this stand could not be considered to be altogether foreign, since the British Avimo concern holds the sales and manufacturing rights for the various Bronzavia items, which varied from lightweight radio equipment, through navigation and oxygen supply items, to the flame-damping exhaust systems which could be seen on quite a number of French machines. Some of the radio equipment was on the French secret list and consequently inexplicable, but there was an interesting lightweight layout for commercial machines (and at present used by Air Bleu on their mail-carrying Caudron Simouns), which seemed to be quite extraordinarily well made as well as light—if the figure which I took down is quite correct. This combined transmitter and receiver, working on a wavelength of 500 to 1,000 metres, and including the generator, weighs only 27 kg. (60 lb.). Following present-day ideas, there are six spot-controlled wavelengths.

Another specially interesting device on the stand was the *cinema-derivometre periscopique*. This is a tail drift-sight, with other useful applications, and designed for absolute accuracy with the aid of a specially controlled sighting bubble. In the ordinary way the sight is adjusted and turned so that the object may be followed on the bubble down a grid wire, but an additional bearing ring is provided for navigational assistance, and, more interesting still, there is a stop-watch arrangement by which the actual

—Franco-British interlude II: Sir Kingsley Wood, during his visit to the Show, chats on the Bristol stand with Capt. Bartlett, Bristol Continental representative. The engine is the Hercules with its new cowling.

speed of the machine can be read off in conjunction with the altimeter indication. The hand of the chronometer is arranged to stop after the prism has been moved, while the object is being followed, through a certain number of degrees. The number of seconds or fifths of seconds is then noted, and the result, when adjusted in accordance with the machine's height, gives an immediate ground-speed reckoning.

Standard Radio were also showing a compact light-weight two-way set working on short- and medium-wavelengths with four spot-frequency positions. The bulk and weight of two-way equipment is certainly getting down to the proportions which will make it usable by any private owner who is qualified to work it, and there will always be plenty of comparatively small machines used in transport operations on which space and payload are severely restricted.

With the present development of the idea of a triangulated beacon system for self-navigation by transport crews, there is now a market for automatic radio beacons, and Standards showed such a transmitter in which accessibility and automaticity have been specially considered. Any signal sequence and time interval can be obtained, and even if the main chronometer fails the transmitter is operated through stand-by equipment. Any failure is indicated both visually and orally by a unit which may be watched elsewhere. No ultra-short-wave equipment was exhibited on this stand, but in the German section the latest Lorenz receiver layout was shown.

### *Automatic Flying*

Apart from the French Air Ministry exhibit, the only other item of radio interest was that on the P.B. Deviator stand, where Marconi D/F equipment was linked up to a two-axis P.B. automatic pilot. The pilot, on its little imitation fuselage, worked well on its own, but, unfortunately, there were so many electrical disturbances in the district that the D/F loop could not possibly do its work with any accuracy. However, the link-up was quite sufficient to show how useful it could be in practice, and on the walls of the stand were examples of air survey work carried out with the help of this practical equipment. These photographs were taken by Capt. Lloyd, who has been doing work of this kind with two Puss Moths and a Bellanca, each one rigged up for automatic radio control while making the survey runs.

After America has been ahead for so many years in such items as electrically heated pitot heads and sensitive altimeters, it was good to see on the Smith stand two examples of their own heated pitot head, which is reputed to be even better than the Kollsman, and a sensitive altimeter with an easily read barometric scale. The smallness of the scale on previous altimeters of this type has always seemed to me to be a bad thing. In this case it is quite impossible for the pilot to make a mistake when resetting the instrument; the figures are large, and there is no question of being, say, ten millibars out in the setting.

Mr. Francis Chichester is now looking after the advanced navigational side at Hughes, and he was on this stand to explain the various devices, which included the new, or comparatively new, averaging sextant, and a Dalton Model G computer, which can be worked with one hand. The averaging part of the sextant really adds up a series of six readings, each of which is a sixth of the particular sight which would otherwise be obtained. After the six sights have been taken, an automatic shutter prevents the operator from attempting a seventh. An experienced navigator could take all six in such a comparatively short space of time that there should be no need to bring the time variation into the calculation.

Among instruments on other stands there was an electrically indicated wind-strength meter on the Short and Mason stand. This has now reached a stage of steady accuracy, and might be used by more than those directly concerned with weather conditions. At clubs, for instance, the appearance of the needle, showing an unsteady 25-30 m.p.h., would be a more effective deterrent to the enthusiastic soloist than the mere statement from his instructor that the weather was too gusty—a statement which is usually taken by the pupil as meaning that the instructor is inconsiderately pessimistic about the pupil's abilities.

### *Outside*

Although I was out at Le Bourget both before and during the Show, I unfortunately saw no signs of the various machines which were to be demonstrated there. Among these were the big Junkers Ju.90 and the Polish P.Z.L. Wicher transport. Not everything can be brought into a Show, and the idea of exhibiting *en plein air* all interesting new types which are actually in production is a good one. But the demonstrations should be given due prominence and treated as part of the Show itself and not as incidental to it. Then those airline operators who are seriously searching for new items for their fleets can see and, if they are not too cynical, try for themselves.

Apart from the various Bloch 220s which are now in full service with Air France, the only other machines of interest at Le Bourget while I was there were some Spanish Government Douglas D.C.2s—all camouflaged and evidently used for the transport of official personages to and from that unhappy part of the world.

I travelled over and back with Air France, and it must be admitted that the Bloch is a good, fast, and comfortable machine—the outward trip was made, tarmac to tarmac, in 1 hr. 5 min., and the return trip in 1 hr. 20 min. —almost too fast for a comfortable lunch. In each case the machine was fully loaded, and the take-off seemed to me to be better than that normally obtained with present-day transport types. And the undercarriages go up and down both smoothly and quickly. Passengers notice undercarriages nowadays. In fact, they are becoming much too critical and knowledgeable for the airline operator's peace of mind.


## STRUCTURAL DESIGN: SOME NOTEWORTHY ARTICLES

NEXT week's issue of *Flight* (December 15) will be a Special Number of particular value to all interested in modern aircraft development.

Entitled "Aircraft Construction Number," this issue will review in detail modern trends in aerodynamic and structural design and materials. The utilisation of components such as engines, undercarriages and high-lift devices in relation to the complete design will be discussed in authoritative articles. A separate section will be devoted to engine development.

***Thursday*** FLIGHT ***December 15***

"Flight" photograph.

**DEFENCE BY NIGHT: Docility during take-off and landing makes the Vickers-Supermarine Spitfire a fine night fighter despite its extremely high performance. This view was secured before a test flight at Eastleigh. The first detailed description of the machine appeared in *Flight* last week.**

# HERE and THERE

## The Air Ministry Goes West

THE Air Ministry was engaged over the week-end, in conjunction with the Office of Works, in transferring certain directorates to the building in Berkeley Square. Sir Kingsley Wood opened the new offices on Tuesday morning.

The directorates transferred are those of Contracts, Technical Development, Scientific Research, Armament Development, Communications Development, Aeroplane Production, Engine Production, Sub-contracting, Armament and Equipment Production, Statistics and Planning, War Planning, Aeronautical Inspection, and Repair and Maintenance.

## Captain Courtney for America

WITH a view to studying some of the latest developments in the United States, in the light of his long experience as a test pilot, Capt. Frank T. Courtney is leaving for America to-day. He expects to be away for about six weeks.

## No A.I.D. Dinner Next Year

OWING to the exceptional pressure of work it has been decided that the annual dinner of the A.I.D. Technical Staff Association, which has been such a popular event for thirteen years, is not to be held in 1939. The decision will be regretted by all who have had the good fortune to be the guests of the A.I.D. T.S.A.

## Lockheed Aircraft's European H.Q.

THE Lockheed Aircraft Corporation announces that it is moving its European sales headquarters from Warsaw to Amsterdam. Mr. Norman Ebin will be in charge, assisted by Mr. Ferris M. Smith, one of the company's research engineers, who was largely responsible for the Lockheed XC35 sub-stratosphere design.

The territory covered by the new organisation will include all Europe, Africa, India and Asia Minor.

## A New Ultra-short-wave Receiver

IN order to provide an installation which can be used to receive the signals of any ultra-short-wave approach beacon transmitter, the Marconi Company have recently designed and are now producing a special receiver, known as the type A.D.66, in which attention has been specially paid to simplicity of operation.

The A.D.66 has only one tuning control, and is subdivided into a number of different units in order that installation may be facilitated. This subdivision has been made possible by the incorporation of the standard "acorn" type of valve, which is particularly efficient on ultra-short-wave lengths. There are actually six separate units, including the main beacon and marker beacon receivers with their appropriate aerial systems, an L.F. magnifier unit, a visual indicator, a control unit with headphones, and a special H.T. battery; the normal power for filament heating is, of course, derived from the machine's battery. The tuning of the main receiver is pre-set to six different frequencies between 30.83 and 36.83 megacycles, any one of which can be selected by means of a six-position control. The control unit incorporates two variable controls and a change-over switch. No controls are arranged on the magnifier unit, the marker beacon receiver or the H.T. battery box, and these may, therefore, be installed in any convenient position on the machine.

## Support for the Air Cadets

LAST week a cheque for £10,000 was sent by Lord Nuffield to the Air League as a donation towards the central fund of the Air Defence Cadet Corps. Lord Nuffield hoped that this would enable the League to obtain the amount still needed to bring the fund to a total of £25,000, which, it is estimated, will be required for a three years' working of the scheme.

Up to the present moment it is understood that twenty-six squadrons have been formed, but the final project envisages a total of two hundred.

The Air Ministry is now supplying each squadron with one aeroplane engine, one course and distance calculator for navigational instruction, a radio set and various instructional diagrams. Certain fabric parts of aircraft will also be supplied shortly.

## The Chelsea College Dinner

CAPT. HAROLD BALFOUR, Parliamentary Under-Secretary of State for Air, will be the principal guest at the annual dinner and dance of the College of Aeronautical Engineering and the Automobile Engineering Training College, Chelsea, to be held at Grosvenor House, London, on Tuesday, December 13.

Col. Sir Donald Banks, Permanent Under-Secretary of State for Air, will also be among the guests, who will include a number of prominent people in aeronautical official circles and the industry.

## Appropriate Greeting Cards

A *FLIGHT* picture by F. Gordon-Crosby has been adopted by Raphael Tuck and Sons, Ltd., as one of their series of Christmas greeting cards. The illustration, beautifully coloured, shows a formation of aircraft against an imposing cloudscape, and is entitled "The Great Sky-way." The cards can be obtained through stationers at 7s. 6d. per dozen, including envelopes, or at 10s. 6d. per dozen with printed name and address.

# COMMERCIAL AVIATION

"Flight" photograph.

**TWENTY-TON TAKE OFF: Last Friday *Cabot*, the first of the improved "C" class Short boats left the Medway on a full-load take-off—carrying a thousand pounds more than *Caledonia* on any of the Atlantic crossings. In due course *Cabot* will be refuelled in the air from 46,000 lb. to an all-up weight of 53,000 lb.**

## THE WEEK AT CROYDON

### *"A. Viator," in his Commentary on Transport Affairs, Discusses the Excellence of Old Aeroplanes, the Refugee Tragedy and the Perennial Works and Bricks.*

CURIOUS how times change. The other day a Fokker F.18 belonging to the Czecho-Slovakian C.L.S. company arrived at Croydon on some sort of a special charter and created quite a stir amongst the younger generation. "What is it?" they asked; and "How queer," they said; yet it is not many years since the type was popping in and out of Croydon on K.L.M. services as regularly as clockwork.

Anyway, the poor old Fokker went and got bogged in a remote corner of the aerodrome whilst being tractor-towed to a hangar and had to stay out all night festooned with obstruction lights. But, mark you, such veterans start up next morning with never a cough and fly all day and night if necessary. Why? Because they have been for years in the hands of airline operating companies, flown by their pilots and maintained by their technical staffs.

Sometimes it is pathetic to see in what sorry state a new type of aeroplane is delivered to the company which has to serve a by no means uncritical travelling public. In the varied conditions in which the company's service has to be operated, the new type is frequently an unknown quantity, for it has seldom been tested by airline pilots.

When things go wrong, when regularity suddenly begins to suffer, who gets the blame from Press and public? Not the manufacturers, of course, but the operating company.

### *Tricycle on Test*

The K.L.M. Stearman Hammond tricycle undercarriage trainer, which has been at Farnborough on hire to the Air Ministry is, I understand, to go to Martlesham for a week. Whether anything much more than what you see on one of those old-iron merchant's hand carts will survive is a question on which experts will probably agree to differ.

After what was said about lack of accommodation last week, *Ensign* made a gallant attempt to get into one of the funny little Croydon hangars. Like the snake in the story, most of her tail was outside and along came one of these winds, "gusting up to 100 m.p.h. as recorded on the roof of the Air Ministry." *Ensign's* tail swung round, and she smote the dozing *Frobisher* on the nose. A new nose cap was fitted and *Frobisher* was on the tarmac ready for service in no time. Not so *Ensign*, both of whose wing tips sustained damage. It is only ten years since *Flight* warned the authorities that proper accommodation was needed for very large aeroplanes.

There is at Croydon a notice board on which the names of passengers, for whom messages or telegrams await, are pinned up. I record the fact that last week there was the name Hitler on the board, and I do not comment further than to remark that there was nothing to indicate that the message was from Neville.

We are blunt, uncultured folk over here, and it is natural, perhaps, if we feel a certain pity for terror-stricken refugees who come through our airports fleeing before a form of culture too high or too low for us to comprehend. Anyway, the whole thing gives us endless difficulties, and last week there were quite a number of folk who had to be returned to other countries.

Last week there was a case of a wretched woman who had to be refused entry—and through no fault of the immigration authorities. She had already been refusel permission to stop in the last country she had been landed at, and England seemed to be her last chance. She had to go back, however, and there was little prospect for her except to be passed on to the country from which she had originally fled. It is not pleasant to be instrumental in condemning people to such a fate.

Then there was the man who was accorded permission to stay with his wife at the Airport Hotel. He was to return "whence he came" (a phrase we use, I think, mainly in connection with the death penalty), and nobody could blame him for disappearing in the night. He was ultimately recaptured and had to leave this country. Are we to regard these things as pleasant, and are we to admire and like the people responsible for them?

An intensive and concentrated series of nice drops of rain at Croydon has evidently set Works and Bricks meditating on the ancient adage, "Water, water everywhere, but not a drop to drink." The time, it seems, is ripe for an intensive well-boring campaign, and the pet well is right in the centre of the passenger car park. Elephants never forget to watch their step when proceeding backwards, we are told, but passenger coaches in reverse may do so—hence the fact that the covering of the well is of thin boards cunningly camouflaged with rich mud.

I am reluctant to believe the story that Bricks suddenly ascended like a bowler-hatted Venus from the depth of this well, atop of a column of intensely aerated water. His remark, "'sanartesian well," was replied to by Works, they say, with the words, "Not at all, my dear Bricks. You have merely punctured, with your little pick, both gas and water mains simultaneously." A. VIATOR.

# COMMERCIAL AVIATION (CONTINUED) : WORLD NEWS

## An Airport Exhibition

THE dates for the Aerodrome Owners' Association's conference and exhibition have now been fixed as February 1, 2 and 3. Both the conference and the exhibition will be held in the Central Hall, Westminster, which, it will be remembered, was the centre two years ago when the exhibition was last held. The exhibition is not open to the general public, but a large number of invitations are being sent out by the Association from 32, Savile Row, London, W.1; additional applications will be considered.

## The Vienna Accident

ONE of the eight occupants of the D.L.H. Ju.52, which crashed near Vienna on December 2, was, unfortunately enough, Captain F. S. Wilkins, an inspector of accidents at the Air Ministry, who was on his way to Baghdad to investigate the loss of *Calpurnia*.

The Ju.52 ploughed through some trees and caught fire, apparently while making an approach to the airport, but all the eight managed to escape, though one of the passengers was seriously injured. The machine was on the night service from Berlin to Vienna, which is the first stage of the semi-experimental weekly run to Baghdad and Kabul.

## Why Not ?

AIR FRANCE, under the guidance of its 46-year-old chief, M. Louis Allègre, has, during its period of existence, pursued a policy of co-operation with other national air lines. The result is that all services linking Paris with other European capitals are, with one exception, operated in pool. Thus, the Paris-Rome service is run jointly with the Italians, Paris-Berlin with the Germans, Paris-Stockholm with the Swedish A.B.A., and Paris-Amsterdam and Paris-Prague with the Dutch and Czecho-Slovakian companies respectively.

The one exception is Great Britain, with which no arrangement exists. Transport authorities on both sides of the Channel have expressed surprise at the apparent delay on the part of the two largest companies to fall into line. In the matter of time-table arrangement alone the public interest would, it is felt, be served by some closer co-operation, but on larger matters, such as interchangeability of passenger-bookings, the inconveniences of air travel could be greatly eliminated. Something may be done now, with the creation of the new merger company.

## The B.A.L.P.A. Party

A VERY successful party was held at the Dorchester last Thursday evening, under the auspices of the British Air Line Pilots Association. It was, moreover, a significant party, because speeches were made by Capt. Harold Balfour, Sir John Reith, and Mr. W. R. D. Perkins, M.P.

Never in the history of the company, said Mr. Perkins, had Imperial Airways pilots been as contented with their lot as they were at present. This he put down to the feeling that, collectively or individually, B.A.L.P.A. pilots could now go to Sir John Reith assured of a fair and sympathetic hearing.

Sir John Reith, in reply, said that he had already seen over forty Imperial pilots, and would always be glad to see those who cared to come to him. "Merger or no merger, public corporation or not," Sir John continued, "I hope that the troubles of the kind we have experienced recently are now definitely troubles of the past."

Capt. Harold Balfour was convinced that the objectives in the minds of airline pilots were the same as those which actuated the Government—which were concerned solely with the best interests of this country and of the Empire. The ideal of the Secretary of State for Air, Capt. Balfour assured his hearers, was a square deal for everyone and a full share in the big future development of British Civil Aviation.

The tone of the speeches was happy, and one may guess that official recognition, to the fullest degree, will shortly be accorded to B.A.L.P.A.—as indeed it ought to be, considering that the majority of airline pilots are members of it.

On December 16, one hears, there is to be a B.A.L.P.A. meeting to consider a working agreement with G.A.P.A.N.

At last Thursday's party it was significant to see how universal was the recognition of B.A.L.P.A., for not only was every possible section of the British air business represented, but also that every foreign airline operating to and from England had a representative present. Starting under such happy auspices the party not unnaturally ended, somewhere between 2.0 a.m. and breakfast time, on a note of decorous hilarity.

## A First Year

SINCE the Allied Airways obtained the mail contract for the Shetlands the company has carried forty-four tons of postal matter between Dyce and Lerwick. The mail service was actually started last November, and only on two occasions has the machine failed to leave Dyce. Needless to say, the installation of D/F wireless facilities at Aberdeen would be of tremendous assistance to the pilots of the service, which is scheduled to operate on four days a week.

## Reorganisation in India

THE *Report on the Progress of Civil Aviation in India and Burma* for 1937-38 is of interest primarily because it completes the story of the period during which air transport in India was being developed without the inevitable stimulus of the all-up air mail scheme which came into operation in February this year. The year concerned was, therefore, a period during which the services in India were being replanned and reorganised in preparation for the much greater use to which they would be put.

Actually during the year only two new air routes were opened —between Bombay and Kathiawar and between Bombay and Delhi—but since February this year the machines operated on feeder services have increased their route mileage from 8,260 to 25,660 miles a week, while the mail loads which they have carried have increased from 2,600 lb. to 12,000 lb. a week. In all, at the beginning of 1938, seven air transport companies were operated in India and one in Burma; these companies operated over nine through routes.

Work is still going on in the development of ground organisation throughout the country, partly for the benefit of the Indian Trans-Continental Airways and Imperial Airways services, and partly for the use of the other companies operating feeder lines.

Short-wave installations were, for instance, provided at Karachi, Delhi, Calcutta and Rangoon, and the present Bellini-Tosi D/F stations on the main routes are being replaced by Adcock aerials at all stations other than Chittagong. With the increase in the amount of feeder-line flying, radio facilities are now being provided elsewhere and stations have been established at Ahmadabad and Bombay for the benefit of Tata pilots.

## Prevention and Cure

AT the risk of appearing to be unreasonably optimistic, it might be suggested that by this time all pilots and air transport operators know much of what there is to be known about the present methods of ice prevention and cure. Nevertheless, for the benefit of those who are not well up in such things, the action of the Goodrich (B.T.R.) de-icer, the Dunlop Anticer and anti-ice pastes are briefly described in a pamphlet which has recently been produced by His Majesty's Stationery Office under the usually voluminous title of *Ice Formation on Aircraft and Its Prevention*.

These descriptions, however, take up only a very small portion of the space devoted to the problem. The pamphlet provides a whole lot of very useful advice about the protection of various parts of the machine and of the power units, and, at the same time, shows that research on the various problems is being vigorously prosecuted by the Air Ministry. It might be complained that it is a little late in the day for the Air Ministry to be prosecuting, however vigorously, tests on two types of de-icing equipment which have been in action for quite a large number of years. But there it is, and the whole matter has been brought into prominence by the fact that transport machines are now required to carry de-icing equipment in some form when they are scheduled to fly in conditions of possible ice formation.

Although the Air Ministry agrees that the use of special pastes is a useful temporary expedient, their opinions on the value of these pastes in their present stage of development are not very high. Only a limited quantity of the active material concerned can be applied to a particular surface, and there is a gradual loss of the paste as it fulfils its functions. When applied to airscrews and highly polished metal surfaces the paste does not prove very satisfactory. The fluid or Dunlop type anti-icer appears only to be effective when this fluid is properly distributed. Very little is said about the possible developments of thermal systems which are being used experimentally, in different forms, in both Germany and France.

The pamphlet opens with a very short introduction dealing with conditions favourable to ice formation, and those who require more complete information can find it in another pamphlet—*Ice Accretion on Aircraft: Notes for Pilots*—issued by the Meteorological Office.

**THE LATEST DEWOITINE : Familiar, but considerably cleaned up and modified in detail, is the new three-engined Dewoitine D.342 which is designed to carry twenty-four passengers in normal service. The undercarriage is, of course, retractable, and with three Gnome-Rhône 14-N.17. of 950 h.p. maximum the machine has a cruising speed (65 per cent power), at 6,560ft., of 200 m.p.h. Its maximum at 5,750ft. is 230 m.p.h.**

## *The Amsterdam-Manchester Service*

IN spite of the hope expressed that it would be practicable to run a service between Amsterdam and Manchester (Ringway) during the whole winter, K.L.M. have, after all, found it necessary to close down until next March. Although the results during July, August and September were extremely encouraging (the traffic during each month being more than 50 per cent. up on the corresponding period of the previous year), there has recently been a serious falling off in passenger bookings. For this the international situation is quite reasonably blamed, but it is hoped that matters will have improved before March, and if all goes well a through-winter service will be attempted again next year.

## *Imperial Mileage*

AS an example of the work which is being done week by week by Imperial Airways on the Empire routes, a compilation of the movements of the Short boats during the week ended November 16 shows that twenty-seven of them flew 138,526 miles—an average of 5,130 for each. The best mileage was put in by *Coogee* (VH-ABC) which flew from Penang to Southampton a distance of 8,002 miles.

During that week *Champion* (C-AFCT), the latest addition to the company's fleet, started work when she picked up the mail from *Calypso* (G-AEUA) at Karachi.

## *The Zurich Service*

IN January, as soon as the pressure of the Christmas mail traffic on the Empire routes has eased off, Imperial Airways hope to start a daily service between London and Zurich. D.H. Albatross machines (the Frobisher class) will be used, and though the schedule time of three hours for the journey will be similar to that of Swissair, it is reasonably hoped that the actual daily flying time may be rather less.

Recently *Frobisher*, the first of the series, flew to Paris on service in fifty-three minutes, giving an average speed of 238 m.p.h. This "commercial" record is, of course, of no intrinsic value, but it at least serves to give an idea of the capabilities of the new fleet. There was little or no following wind. The second of the series, *Falcon*, is now at Croydon.

## *Pressure Cabin Experiments*

VERY shortly General Aircraft will have a special Monospar Universal flying with a pressure cabin. In this machine a new system of air control is used to retain sea-level pressure at all altitudes. The action of the apparatus is entirely automatic and, apart from the fact that it is kept at a normal pressure, the air is also kept at a uniform temperature whether the machine is flying or standing on the ground.

Following the company's successful experiments with tricycle undercarriages, this new pressure cabin development should be of great assistance to them when they proceed with the construction of a large passenger transport machine. Incidentally, though the value of a pressure cabin so far as passenger comfort is concerned is fairly well understood, very little mention is usually made about the minor difficulties which a change of pressure can cause. The majority of regular airline passengers on long-distance runs have appreciated the effects on such things as fountain pens and bottles of sun-tan lotion, which leak disastrously either in the pocket or in the baggage. Another point is that only in a properly controlled pressure cabin is it possible to serve freshly made tea or coffee, since otherwise the boiling point of the water is very much lower.

## *D.N.L. to Amsterdam*

EARLIER this year, when describing the operations of Det Norske Luftfartselskap, *Flight* hinted that the company might very shortly be extending its operations farther afield. We learn that Capt. Riiser Larsen, the managing director of D.N.L., has recently visited Copenhagen to discuss the possibility of co-operation with D.D.L. in a proposed Norwegian service from Christiansand, via Oslo and Copenhagen, to Amsterdam. It is hoped that this service will be started early next year.

## *The Bathurst Accident*

JUNKERS are certainly not being very lucky with their big Ju.90. Last year, it will be remembered, the prototype was lost during the high-speed vibration (or flutter) experiments, and now another example of the type has crashed at Bathurst (Gambia), where the machine was being tried out for use in tropical operations.

The accident occurred on November 26 on the machine's first test flight there, when, immediately after the take-off, the machine struck a palm tree on the outskirts of the aerodrome. Eleven of the fifteen technical experts and other official occupants were killed, including Flight Captains Blankenburg, who was one of D.L.H.'s most experienced Atlantic pilots, and Untucht, who was equally well known.

## *Jersey Traffic*

DURING the first twelve months of operation at the new Jersey Airport, 34,559 passengers were carried in and out by Jersey Airways. This figure shows that Jersey Airport is busier than any in the British Isles other than Croydon, where last year's figure was 155,856.

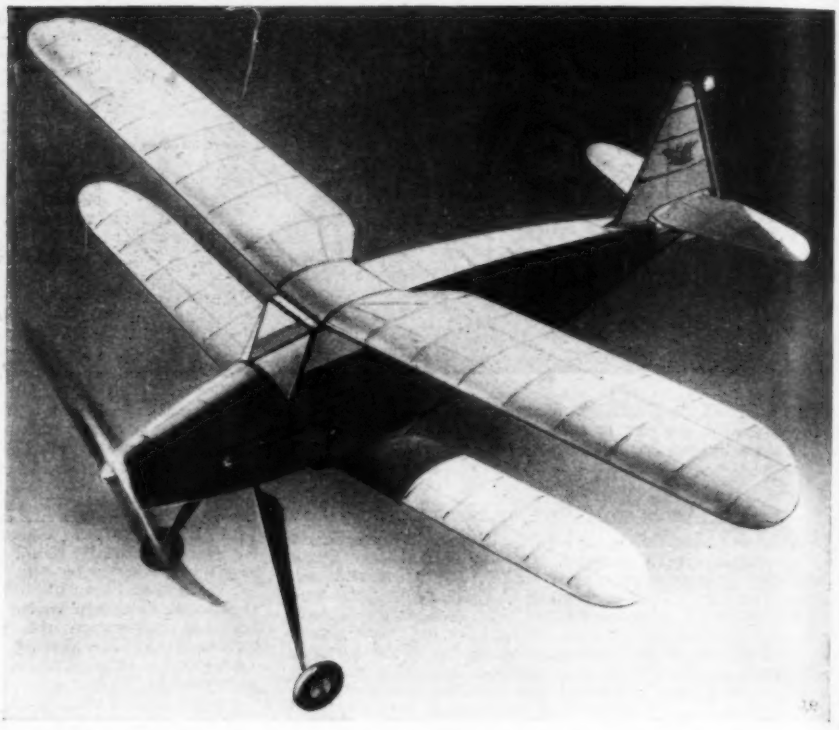
Incidentally, Jersey Airways are now operating additional services in the afternoon between Jersey and Southampton. The machine leaves Jersey Airport at 3.30 and, by making use of the morning service leaving Southampton at 7.55 a.m., business people will thus be able to spend 6½ hours on the Island and to return to England on the same day. There is a connecting train for London, which can be caught with ample time to spare.

This new service is incidental to the fact that Jersey Airways are now carrying newspapers over to the Channel Islands every morning, in the winter as well as the summer.

## *Air France and Far East*

OWING to the demand from all over Europe for seats on the new accelerated Air France service to India, Burma, Indo-China and Hong Kong, leaving London on Wednesdays, as well as the Saturday departure to the Near East, terminating at Baghdad, the company has occasionally experienced difficulty in finding accommodation for British passengers As a result, the Paris office of Air France has now allotted a definite number of seats on both weekly services to the London branch, with the effect that the old difficulties have largely been removed.

There has been an important modification in the long-distance route to Hong Kong as a result of the re-equipment of the line with the fast Dewoitine 338s. Instead of splitting the service up at Bangkok, one machine going to Saigon and the other to Hanoi, the Dewoitine now continues right through to Hong Kong, stopping at both Saigon and Hanoi. This involves covering two sides of a triangle, but with the faster machines the schedule is unaffected, Hong Kong being reached on the Thursday, eight days after departure.



The Crow biplane model described below.

# MODELS

By M. R. KNIGHT

## Harnessing the Stall

THE biplane model, though gaining in popularity, is still suspect among those enthusiasts who assess excellence solely in terms of flight duration. It is interesting, therefore, to learn that one eminent model designer, Mr. S. R. Crow, of the Blackheath Model Flying Club, believes that the staggered biplane layout offers *improved* duration, *via* exceptional climb and consequent prolonged glide. Since he holds the British biplane hand-launched record with a flight of 3 min. 24 sec., his contention would appear to be not without foundation, and his *modus operandi* will doubtless be of interest.

The upper wing is relied upon to provide most of the lift required. It therefore has a section of higher lift characteristics and greater area and incidence than has the lower plane, which is used largely as a stabiliser. Other essentials are forward stagger and ample power. The model is trimmed to give such a flat glide that there is a stalling tendency under power, especially, of course, with the first burst from the rubber motor.

This normally detrimental factor is transformed into an asset by the simple expedient of offsetting the airscrew to turn the model against the torque. The large wing-area well forward holds the nose up at an acute angle, the stagger apparently acts as a slot, and the short span allows of a rapid and steep upward spiral to a considerable height.

## The Crow High-efficiency Biplane

THE model depicted above—the latest version of Mr. S. R. Crow's record-holding biplane—constitutes a powerful corrective to the fallacy that "semi-scale" appearance inevitably spells poor flying qualities.

Built largely of balsa, the model weighs 5 oz. The cantilever wings are of constant chord, and are swept back 1½in. Their total area is approx. 210 sq. in., and they are attached to the fuselage in the conveniently flexible manner afforded by rubber bands. No interplane struts are required. Each wing is made in one piece, and has a dihedral angle of 6 deg. The upper plane has a span of 38in., a chord of 4½in., and an aerofoil section with a concave lower surface. The lower plane is 31in. from tip to tip, has a chord of 3½in., and a section with a flat lower surface. It is staggered ¾in. behind the upper plane. The trailing-edges are of ⅛in. × ⅛in. balsa, the two mid-spars are ¼in. × ⅛in. and ⅛in. × ⅛in. respectively, and the trailing edges are ⅛in. × ⅛in. Balsa sheet 3/32in. thick is used for the ribs, and ⅛in. × ⅛in. birch for the tips. The centre sections are coverd with balsa sheet.

The shapely fuselage is 27in. long, 2½in. wide, and 4½in. deep, and consists of four longerons of 3/32in. × 3/32in. balsa, cross-strutting of the same material, bulkheads of 3/32in. balsa sheet, and numerous light stringers forming the decking. A 5in. × 5in. upper fin is built integrally with the fuselage, likewise the small lower portion. Through a slot between fin and fuselage slips the lifting-section tailplane, where it is secured with rubber bands. This component is small, reckoned by model standards, its span being 16in., and its chord tapering from 4in. to 2in.

Celluloid wheels 1½in. in diameter are carried by 20-gauge wire stub-axles on bamboo struts faired with balsa sheet. These struts plug into well-reinforced paper tubes within the fuselage, and can be withdrawn for packing purposes. They combine low head-resistance with adequate lateral and longitudinal flexibility.

The model is powered by 7 yards of ¼in. flat rubber strip, arranged in eight strands. A 13½in. airscrew, with a simple free-wheeling device is fitted. All surfaces are covered with Japanese tissue and doped.

## Women Model Designers

AN effective display of successful flying models was staged by the Society of Model Aeronautical Engineers in the Hobbies section of the Women's Fair, just concluded at Olympia. One has on occasion seen excellent examples of feminine model aircraft construction, but here for the first time one encountered work by women designers. Miss M. E. Green, of Croydon D.M.A.C., exhibited a sound tapered high-wing machine to the Wakefield formula with such refinements as trimming-tabs. Mrs. Worley (Northern Heights M.F.C.) was responsible for a tapered shoulder-wing with oval multi-stringer fuselage, noteworthy for the highly ingenious wing-attachments and undercarriage.

Great interest was taken by the public in the model with which Mr. R. Copland, in Yugoslavia, helped to win the King Peter Cup for Great Britain, incidentally establishing a world record (subject to homologation by the F.A.I.) of 33 min. 9 sec. The model is a perfectly proportioned tapered and backswept shoulder-wing, with oval multi-stringer fuselage, and two small auxiliary rudders.

## "Wakefield," 1939

THE S.M.A.E. has arranged a very comprehensive series of outdoor contests for 1939, details of which will be given next month. Meanwhile certain outstanding items call for comment, notably the Wakefield Cup contest, which, of course, takes place in America. The British team will be chosen in eliminating trials at Fairey's Great West Aerodrome on Whit-Sunday, May 28, 1939. Subject to American agreement, which is confidently expected, the models specification will remain as in 1938, namely, 190-210 sq. in. of wing area, tail area not exceeding 33 per cent. of wing area, and minimum weight of 8oz.

Plans are afoot to send a full complement of men and models to America to (let us hope) repeat the British victory of 1936. A very necessary "Wakefield Fund" to cover the heavy expenses involved in thus maintaining British prestige will be inaugurated by a buffet dance and social evening, to be held by the S.M.A.E. on Wednesday, December 14, from 7.30 to 12, at Lysbeth Hall, Soho Square, London, W.1. This is open to everyone interested, and tickets (4s. each) can be obtained from Mr. H. York (171, New Kent Road, London, S.E.1).

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The next S.M.A.E. contest for the *Flight* Trophy will be held at Cranwell R.A.F. Aerodrome on Sunday, June 11, 1939, and will be for petrol-engined models. There are now many highly successful examples in this country, and a record entry is confidently expected.

# THE INDUSTRY

## From Water to Air

AMONG the latest recruits to the ranks of concerns assisting in the aircraft production programme is a well-known firm of marine engine constructors, Watermota, Ltd., of Hampton Wick, Middlesex. They are making parts for the Bristol Blenheim and Fairey Swordfish, and for Boulton Paul Aircraft, Ltd.

They have installed new machinery and are in a position to undertake further aircraft work. Milling is one of their specialities.

## British Timken Appointments

MR. J. E. SPEAR has been appointed sales manager, Engineering Division, of British Timken, Ltd., the makers of roller and ball bearings.

The position of railway representative to this company, thus vacated by Mr. Spear, has been filled by Mr. H. C. Tuffill, B.A.

## Measuring Works Lighting

A HANDY and inexpensive illumination meter designed for measuring the efficiency of works lighting is now being produced at the Salford Instrument Works of G.E.C. It gives direct reading in foot candles from 0 to 250. Full details are obtainable from the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

## Light Alloy Sections

A FINELY produced catalogue of alloy sections has lately been published by Birmabright, Ltd., Dartmouth Road, Smethwick, Birmingham. It illustrates the whole of their range of sections to full scale and dimensioned in detail, and physical and mechanical characteristics of the alloy are also set out. The new publication should be of very great assistance to aircraft constructors' design and purchasing staffs.

## Mr. J. L. Stanton

MR. J. L. STANTON, who was recently announced as having joined the Bedford School of Flying as chief ground engineer, states that he is no longer connected with that organisation. Mr. Stanton recently returned from Turkey, where he represented D.H.s and looked after the equipment used by the Turkish State Air Lines. Previously he was for nine years in the inspection department of the De Havilland Company, four years chief engineer with Hillman's Airways, and two years in the same capacity with the Irish Aero Club.

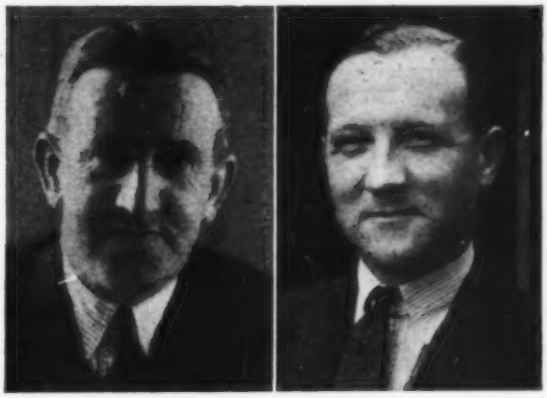
## Bristol Capital Increase

AT an extraordinary general meeting of the Bristol Aeroplane Co., Ltd., held at Bristol on November 29, the chairman, Mr. W. G. Verdon Smith, C.B.E., said:—

"You are being asked to-day to pass resolutions providing for (1) the increase of the Ordinary capital, and (2) the capitalisation and appropriation of that portion of the Reserve Fund derived from premiums received in 1936 on the Ordinary shares issued at that date. . . National requirements have placed heavy demands on the aircraft industry, and your company is making an invaluable contribution to the rapid building up of the country's air defences. With this object additional factories and additions to the existing factories have had to be erected and equipped with the necessary plant and machinery. . . . Some of the new buildings and equipment are being provided by the Government, inasmuch as the Government has required for the Royal Air Force expansion programme a scale of production which cannot be regarded as likely to continue beyond a limited period.

"A large proportion of the additions, however, will represent assets of a permanent character which there are good grounds for anticipating will remain productive of reasonable profits even after a return to more normal conditions. Naturally the proceeds of the new shares subscribed for cash will be utilised in the first place in repayment of present indebtedness. Outlays on stocks and work in progress, however, are likely to be so heavy in amount for some time to come that there will undoubtedly be further cash requirements, and these it is intended to meet by temporary bank advances from time to time."

The resolutions set out in the notice convening the meeting were submitted and carried unanimously.



**ELECTED DIRECTORS of the Anglo-American Oil Co., Ltd.: Mr. A. Waterson (left) and Mr. J. L. N. Pollock. The former was closely associated with the company's interests in Scotland until 1934, when he became a general sales manager at the head office. The latter controlled sales in the north and east, and subsequently in the Bristol area, and, after studying European markets, likewise became a general sales manager.**

## Riveting Pioneers

AN interesting claim made by De Bergue's Patents, Ltd., Strangeways Ironworks, Manchester, 3, is that they are one of the oldest established makers of pneumatic riveting machinery, and that they actually had the first air compressing plant in this country; it was installed at their present works in Manchester.

De Bergue's are, of course, the proprietors of the patented riveting process which bears their name and which is so widely used in the aircraft industry, particularly for tanks and various flush-riveted parts.

Apart from manufacturing the equipment used for the process, the company also makes a wide range of riveting machines, fixed and portable. Pressures of from two to 150 tons are available, with depths of gap up to 10ft.

## Intava Progress

SINCE the aviation sales interests of the Anglo-American Oil Co., Ltd., and the Vacuum Oil Co. were pooled under the name of Intava, Ltd., last July, remarkable progress has been made, and there have been a number of notable flights in which Intava products have figured.

For instance, *Mercury*, powered with four Napier Rapier engines, lubricated with Intava Red Band oil, made the first non-stop flight between the British Isles and Montreal on July 20-21.

Shortly afterwards the Focke-Wulf Condor flew from Berlin to New York and back, using Intava fuel and oil for its engines and Intava aviation speciality products for the lubrication of its instruments, automatic pilots, etc.

The Air France boat, *Lieutenant de Vaisseau Paris*, which is carrying out experimental flights across the Atlantic, is also running on Intava aviation fuels and has been refuelled under difficult conditions at Lisbon in record time.

On September 2, Herr Wolfgang Ziese left Berlin at 00.01 hours and carried out a "round the capitals" flight via Croydon, Paris, Rome, Bucharest, Warsaw and Stockholm, arriving back in Berlin in only seven minutes over the twenty-four hours, after covering nearly 4,000 miles. His machine was a Siebel with two 200 h.p. Hirth engines. The lubricating oil was again Intava.

## Birmid Industries

AT the annual general meeting of Birmid Industries, Ltd., held in London last week, the chairman (Mr. Cyril C. Maudslay) reviewed the activities of the various companies comprising the group.

The Birmingham Aluminium Casting Co. had been busy in all its departments, and the new foundry erected specially for aero castings had been taxed to its utmost limits.

The increase in the use of Magnesium Elektron castings had been phenomenal, and aircraft designers now appeared to have perfect faith in this metal. Sterling Metals, Ltd., had experienced the same increase as the Birmingham Aluminium Casting Co. in the demand for Elektron castings.

Birmabright corrosion-resisting alloy was still making steady headway, and Mr. Maudslay was glad to be able to report that

# THE INDUSTRY (CONTINUED)

they were now turning out considerable quantities of Birmabright sheet and extrusions at Birmetals, Ltd.

Mr. Percy Pritchard (who, said the chairman, had been largely responsible for getting the new Birmetals Plant under way) was called upon to tell the meeting something of the progress made in that connection. He said that the erection of the plant was completed about February of this year, and two or three months were spent in tuning up, training workpeople, and getting over initial teething troubles. He was satisfied that, as regards equipment, they had one of the finest, if not the finest, plant in the country for the production of strong, light alloy sheets and sections.

They had concentrated on producing a high-quality product, and in this connection they had already been congratulated on the excellence of the material they were producing. Largely as a result of this, the demands which were now being made upon these works were such that they had already had to arrange for the installation of some additional plant and equipment to balance their output, and which would, when installed, give them an increased productive capacity.

## Distance-record Echo

NEWS of another item of equipment that figured in the Wellesley long-distance flight comes from the Tungum Sales Co., Ltd., Iddesleigh House, Caxton Street, London, S.W.1. They state that their Tungum tubing was used for such vital services as fuel- and oil-supply lines. Tungum is a special non-ferrous alloy offering high resistance to corrosion.

## Comprehensive Catalogue

A REMARKABLY comprehensive 70-page catalogue of the aircraft and accessories for which they are agents has been produced by the Indian branch of R. K. Dundas, Ltd., of The Airport, Portsmouth, and New Delhi Aerodrome, India.

Covering Airspeed, Percival, and Phillips and Powis Aircraft, Wolseley engines and instruments, aircraft equipment, and aerodrome and works equipment generally, the catalogue is so comprehensive and well illustrated that in itself it forms a very useful work of reference.

## A Dowty Dinner

OVER 540 people, including representatives of a number of the firm's sub-contractors, were present at the annual dinner of Aircraft Components, Ltd., at Cheltenham Town Hall last Friday. Mr. A. W. Martin, chairman of the company, opened the speeches by proposing the guests, and the Mayor of Cheltenham replied. Proposing the toast of the aircraft industry, Mr. D. L. Lipson, M.A., M.P., spoke of the good and evil uses of the aeroplane. He went on to congratulate Aircraft Components, Ltd., on the conscientious way in which they had helped to preserve the amenities of the town of Cheltenham. Of Mr. Martin, he said he had known him in earlier years as the managing director of the Gloster Company, which had depended very greatly on his efforts for its success.

Replying to the toast, Mr. F. McKenna, general manager of the Gloster Company, spoke of the relations between the aircraft firms in the neighbourhood; almost daily, he said, they stole workmen from one another and yet they remained good friends. Before asking Mr. Gwynne Clark, the assistant works manager of Aircraft Components, to propose the toast of the firm, Mr. R. H. Bounds, A.F.R.Ae.S. (in the chair), expressed sympathy with Mr. Kelly, who had worked hard to make the dinner a success; he was just recovering from a serious illness.

Replying to the toast to the firm, Mr. G. H. Dowty, F.R.Ae.S., M.I.Ae.E., managing director of Aircraft Components, Ltd. told of its progress in eight years. He was proud to say that the production programme was ahead of schedule and there had been no complaints either from the aircraft industry or from the Air Ministry. He was sorry that the growth of the firm was almost entirely due to rearmament, but the international unrest seemed to leave no alternative but to increase our defences.

Reviewing present progress, Mr. Dowty said that the most far-reaching development the firm had recently made was that of their new wheel.

Mr. Dowty concluded by thanking the many sub-contractors present for their co-operation, which had made the company's production programme possible.

## NEW COMPANIES

PAUL BEREND, LTD.—Private company, registered November 14. Capital, £2,000 in 2,000 shares of £1 each. Objects: To carry on the business of manufacturers, fitters and repairers of and dealers in plugs, spinners for airscrews, and propellers and parts, and components and accessories, etc. The subscribers (each with one share) are: Paul Berend, manufacturer, and Henry Klein, merchant. The first directors are not named. Solicitors: Kenneth Brown, Baker, Baker, Essex House, Essex Street, London, W.C.2.

BICKERTON'S AERODROMES, LTD., was registered as a private company on November 14 with a nominal capital of £100 in 100 shares of £1 each. The objects are to acquire, lay out, erect, maintain and manage aerodromes, training schools, airports, etc., for aircraft of all kinds and to carry on the business of aircraft manufacturers, etc. The subscribers (each with one share) are: John M. Bickerton, aerodrome proprietor, and Geoffrey M. Brown, solicitor. The first directors are to be appointed by the subscribers. Registered office: 3/4, Clements Inn, London, W.C.2.

AERO REPAIRS, LTD.—Private company, registered November 10. Capital, £100 in 100 shares of £1 each. Objects: To carry on the business of manufacturers and repairers of aircraft, engines, instruments, accessories or components, etc. The directors are: Percival F. Cansdale and Basil C. Cocks. Registered office: 26-7, King Street, London, E.C.2.

WEST SUFFOLK AERO CLUB, LTD.—Private company, registered November 11. Capital, £1,000 in 1,000 shares of £1 each. Objects: To operate a civil flying school and club at the municipal airport at Bury St. Edmunds or elsewhere. The directors are: Courtney N. Prentice (director of Sun Petroleum Co., Ltd.), Mrs. Ethel Prentice. Registered office: Municipal Airport, Bury St. Edmunds.

SEMAPE, LIMITED.—Registered as a private company on November 10 with a nominal capital of £1,000 in 1,000 shares of £1 each. Objects: To carry on the business of manufacturers, inventors, designers and patentees of, agents for and dealers in fuel tanks proof against destruction or injury for use in aeroplanes, etc. The first directors are to be appointed by the subscribers. Registered office: 52, Lincolns Inn Fields, London, W.C.2.

AERO-DIESEL ENGINES, LTD.—Private company, registered November 11. Capital, £5,500. Objects: To develop a new type of reciprocating engine pump or compressor and to enter into an agreement. The subscribers are: Margaret Heslop, secretary, and B. Wace, secretary. The first directors are to be appointed by the subscribers. Registered office: 3, Bloomsbury Place, London, W.C.1.

MAGNAL PRODUCTS, LIMITED, was registered as a private company on November 7 with a nominal capital of £30,000 in 30,000 shares of £1 each. Objects: To carry on the business of manufacturers of and dealers in forgings, castings, plates, aerodrome equipment and component parts thereof; wood and timber merchants, iron and brass founders, aeronautical, manufacturing, civil and general engineers, etc. The first directors are: Archibald G. Frazer-Nash, Esmonde G. Thompson and Henry W. Healy. Solicitors: Godden, Holme & Ward, 34, Old Jewry, London, E.C.2.

TAYLORCRAFT AEROPLANES (ENGLAND), LTD.—Registered as a private company on November 21 with a nominal capital of £15,000 in 15,000 shares of £1 each. Objects: To adopt an agreement with Fairchild Aviation Incorporated and Taylor Young Corporation, and to carry on the business of manufacturers, letters on hire or hire-purchase and dealers in all kinds of aeroplanes and component parts thereof, etc. The permanent directors are: Alfred L. Wykes, Barrow-on-Soar, Leics, Frank Bates and Percy Wykes.

HAYES ENGINEERING CO., LTD.—Private company, registered November 23. Capital, £10,000 in 10,000 shares of £1 each. Objects: To carry on business as aeroplane engineers and builders, manufacturers of and dealers in components, etc. The subscribers (each with one share) are: Chas. W. Hayes, "The Woodlands," 128, Reddish Road, South Reddish Stockport, engineer, and Robert C. Thomas, incorporated accountant

HOPE AVIATION LTD.—Private company, registered November 23. Capital £10,000 in 10,000 shares of £1 each. Objects: To carry on the business of letters out on hire of flying machines, carriers of passengers and goods by air, etc. The directors are: Walter L. Hope and Harold Riley, M.C. B.Sc., A.M.I.E.E. Registered office: 21, Lime Street, London, E.C.3.

## AERONAUTICAL PATENT SPECIFICATIONS

(*Published November* 24, 1938.)

8191. SCOTT, B. D.: Casings or cowlings of aircraft engines (494,413).
8719. RICHARD, P. A.: Method of and means for mounting air-cooled engines on aircraft (494,576).
11522. TAMPIER, R.: Means for controlling or preventing the movements of ailerons, rudders, elevators, or other moving parts of aircraft (494,579).
12390. MARCONI'S WIRELESS TELEGRAPH CO., LTD., and WRIGHT, G. M.; Navigation-aiding radio systems (494,697).
12398. CIERVA AUTOGIRO CO., LTD., and BENNETT, J. A. J.: Aircraft sustaining rotors (494,427).
15860. SPERRY GYROSCOPE CO., INC.: Automatic or semi-automatic pilots for aircraft (494,350).
21447. ASKANIA-WERKE AKT.-GES. VORM. CENTRALWERKSTATT DESSAU UND C. BAMBERG FRIEDENAU: Means for regulating the fuel supply in internal-combustion engines (494,534).
32726. LORENZ AKT.-GES. C.: Radio direction finding systems (494,541).
32783. BLUME, W., and ARADO FLUGZEUGWERKE GES.: Alighting gear for aircraft (494,542).
5458. PORSCHE, F.: Means for testing aircraft engines (494,482).
6853. LORENZ AKT.-GES., C.: Wireless direction-finding systems (494,555).
8743. PUTEZ H. C. A.: Automatic means for ensuring extension of retractable alighting gear for aircraft (494,557).
9349. CESKOSLOVENSKA ZBROJOVKA AKCIOVA SPOLECNOST BRNO.: Fuel-injection arrangements for multi-cylinder Diesel engines (494,649).
11670. ARADO FLUGZEUGWERKE GES.: Control device for aircraft (494,496).
16596. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Radio direction-finding receivers (494,408).
16507. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Direction-finding radio receivers (494,564).
28664. CIERVA AUTOGIRO CO., LTD., and BENNETT, J. A. J.: Aircraft sustaining rotors (494,739).

(*Published December* 1, 1938.)

9102. SPENCER, J., and SHARMAN, G. A.: Apparatus for controlling the flight of aircraft (494,760).
12262. SPERRY GYROSCOPE CO., INC.: Indicating-instruments (494,945).
12574. FLUGZEUGWERK HALLE GES.: Locking aircraft control surfaces (494,961).
29363. DEUTSCHE VERSUCHSANTALT FUR LUFTFAHRT, E. V.: Anti-friction journal-bearings for shafts (494,861).
31577. BLUME, W., and ARADO FLUGZEUGWERKE GES.: Auxiliary wing for aircraft (494,863).
33558. STANDARD TELEPHONES AND CABLES, LTD.: Antenna network particularly applicable to systems for radio guiding of moving vehicles (494,801).
8005. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Production or assembly line trackways (494,817).
8861. ARADO FLUGZEUGWERKE GES.: Fuselages for aircraft (494,936).
10672. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Positioning of jigs or the like for supporting a workpiece during construction or assembly (494,888).
10859. LORENZ AKT.-GES., C.: Radio-transmitting arrangements particularly for direction-finding systems (494,822).